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FARM BOOKLET

1931-32



F. H. BRUNNING PTY. LTD.
57 ELIZABETH ST., MELBOURNE

BRUNNING'S

1931-1932

FARM BOOKLET



Brunning's No. 1 Store, 22 Hanna St., South Melbourne.

Nearly 80 years of Reputation behind Brunning's Seeds.

The business of F. H. Brunning Pty. Ltd. was founded in 1852 by the late William Adamson, purchased by the late George Brunning in 1889, and taken over by the late F. Hamilton Brunning. On his death, the business was formed into a Proprietary Company, first functioning as such in February, 1906.

F. H. BRUNNING PTY. LTD.

Registered Telegraphic Address: "Myosotis," Melbourne.

3rd Floor, Melbourne Sports Depot Bldgs.

57 ELIZABETH STREET, MELBOURNE

BRUNNING'S TERMS OF BUSINESS

ORDERS:—The very best personal care and attention is given to every order, be it large or small, simple or intricate, so that under reasonable conditions, the goods must prove satisfactory to clients and a credit to the firm. Although all enquiries and orders receive prompt attention and deliveries are effected as speedily as circumstances of the season permit, clients are requested to co-operate in facilitating prompt despatch and eliminating the possibility of errors by **writing all orders on a separate sheet of paper** from general letters containing enquiries, and to **write all addresses and signatures fully and clearly**. Please indicate the nearest Railway Station or Shipping Port when goods are to be sent by rail or boat.

QUALITY:—The reason that Brunning's Seeds have always been so satisfactory may be summed up in the one word "**Selection**." The past high quality of Brunning's "Incomparable" Seeds, has been fully maintained and every care taken in the "**selection**" and "**testing**," not only for germination but for quality and production, so that the highly-prized reputation gained and upheld during the **past 79 years** may be kept at the same high level.

PRICES:—As owing to the dependency of seed crops on weather conditions, rates are liable to fluctuate, **quotations will be submitted** as required **on application**, and **no prices are included in this Catalog** which is issued merely as a list of the goods sold by us. **Clients are requested**, when enquiring for prices, to submit their **approximate requirements** and quantities thereof.

TERMS OF PAYMENT:—Unless otherwise specified at time of sale and marked on the invoice, **all goods are sold on the basis of Monthly Account**, i.e. goods supplied during one month are due for payment on the 28th of the succeeding month. All quotations are made on a **Strictly Nett Cash basis** and either f.o.r. or f.o.b., Melbourne.

REMITTANCES:—Payments may be made by cheque (Crossed and marked "Not negotiable"), Bank Draft, Postal Note or Post Office Order, or for small amounts, postage stamps of the Commonwealth of Australia will be accepted. New Zealand, Fijian and other oversea clients are requested to remit by Bank Draft or Post Office Order and not by stamps or postal notes, which are not negotiable in Australia. Exchange must be added to all country and interstate cheques, the rates being 6d. for Victoria and 1/- for Interstate.

NEW CLIENTS:—New Clients are requested to either **forward cash** with their orders, or **give the name of a reputable Melbourne firm as reference** to their financial standing. Where it is not possible to give the name of a Melbourne business house for this purpose, please **submit your bankers**.

GOODS TRAIN CONSIGNMENTS:—The attention of clients is directed to the fact that under the "nominated days of loading system" now in force on the Victorian Railways, **goods are only accepted for despatch to country stations on certain days** and at specified times.

In some instances, goods are only accepted on **one specified day each week**, others have two loading days, and some three days per week, while certain stations enjoy the privilege of a daily loading.

Clients are recommended to **make themselves acquainted with the specified loading days** and to send their orders accordingly to prevent a delay arising over which we have no control. If unable to obtain these particulars from the local stationmaster, write us and we will gladly supply the necessary information.

DAMAGE IN TRANSIT:—All goods are delivered to rail properly and securely packed, and it is understood that **after receiving a receipt** from the Victorian Railways for delivery in good order and condition, our **liability for any damage, loss or miscarriage ceases**. To ensure safety in transit as well as recompense from the Railways for any damage that may occur **All Consignments per Goods Train** are now forwarded at "**Commissioner's Risk**" by which the Railways accept the same liability as any common carrier. If goods are required at "**Owner's Risk**," please **stipulate** at time of ordering. The Extra Freight involved by the "**Commissioner's Risk**" is very little more, while the extra protection is well worth same.

SACKS, BAGS & CASES:—All sacks, bags, cases, etc., are charged at cost. With the exception of Grain, all **Seeds are charged at nett weight**, the tare of the sacks being allowed and the packages being charged extra. Sacks, bags and cases **returned within 14 days** from the date of invoice **freight prepaid to Melbourne** will be **credited at two thirds** the amount invoiced, providing they are received in good order and condition.

F. H. BRUNNING PTY. LTD.

1st March, 1931.

BRUNNING'S "INCOMPARABLE" FARM SEEDS

Although this booklet is primarily intended to be of an informative rather than of Catalogue nature, the following list of Farm Seeds sold by us will facilitate readers in making enquiry as well as in selecting their requirements. As this booklet may be in force for several years owing to the fact that rates for farm seeds are so liable to fluctuation, it is impossible to include any prices, but quotations will gladly be submitted and information given at all times. Brunnings make no charge for service of this description and welcome correspondence.

When writing for quotations please indicate your approximate requirements specifying what sort or sorts, as well as the likely quantities of each. In many items there is more than one quality available, but Brunnings recommend the best as being the cheapest (not necessarily the lowest priced) at all times.

CLOVERS

Alsike Clover
Burr Clover (Native Trefoil)
Cowgrass, Prime Imported
Cowgrass, New Zealand
Brunning's Giant Colonial Cow-
grass

Perennial Red Clover
"Tarwei" Strawberry Clover
Subterranean Clover
Drooping-Flowered Clover (T. Cer-
 num)
Suckling Clover

Wild White Clover, Genuine New Zealand Grown.

"Mesgawi" Berseem Clover
Clustered Clover
Crimson or Italian Scarlet Clover
English Trefoil or Black Medick
Lotus Major (Greater Birdsfoot
 Trefoil)
Lotus Hispidus (Boyd's Clover)
Sheep's Trefoil
Sweet or Bokhara Clover
White Dutch Clover, Prime Imp.
White Dutch Clover, Supergrade
New Zealand

LUCERNE

New Zealand Marlborough Grown

French Provence Imported

Note.—All Imported Lucerne is stained in accordance with the regulations of the Commerce Act of Australia.

Giant Upright Broadleaf Hunter River—

- (a) "STANDARD Triple Machine dressed
- (b) Supergrade Double Machine dressed
- (c) Prime Machine-dressed

See Page 10 for fuller details of these distinct qualities.

ANNUAL SUMMER FODDERS

Sudan Grass, Genuine "Garawi"
Sudan Grass, Victorian M/D
Ambercane
Sorghum Saccharatum
Soy Beans
Hungarian Millet or Panicum

Japanese Millet, Brunning's
"Standard"
Japanese Millet, Machine-dressed
Imphee or Planter's Friend
Sacaline Sorghum
Cow Peas

ROOT CROPS

Mangel, Mammoth Long Red
Mangel, Champion Yellow Globé
Swede, Champion Purple Top
Swede, Elephant Purple Top
Swede, Skirving's Purple Top
Swede, Bangholm Purple Top
Swede, Ne Plus Ultra
Turnip, Purple Top Milan
Giant Half Sugar Mangel, White

Giant Half Sugar Mangel, Rose
Field Carrot
Turnip, Purple Top Mammoth
Turnip, Purple Top Yellow Aber-
deen
Turnip, Green Top Yellow Aber-
deen
Turnip, White Globe
Turnip, Purple Top White Globe

GRAINS

Cape Barley
Skinless Barley, White-seeded
Skinless Barley, Black-seeded
Tick or Horse Beans
Blue Lupins

Dun Field Peas
Partridge or Maple Field Peas
Ryecorn
Tares or Vetches
Maize

Algerian and all other General Purpose Oats.

PASTURE GRASSES

Cocksfoot, Genuine "Akaroa"	Creeping Bent
Cocksfoot, New Zealand Grown	Waipu Browntop or Colonial Bent
Cocksfoot, Danish Grown	Crested Dogstail
Couch Grass (Cynodon Dactylon)	Chewing's Fescue
Kentucky Blue Grass	Paspalum Dilatatum
Phalaris Tuberosa (syn. Bulbosa)	Paspalum Compressum or Carpet Grass
Prairie or Rescue Grass	Rib or Plantain Grass
Rhodes Grass	Rough Stalked Meadow Grass
Tall Oat Grass	Timothy Grass
Wallaby Grass, Pilosa	Wallaby Grass, Semi-Annularis
Wood Meadow Grass	Yorkshire Fog Grass

RYEGRASSES

Irish Perennial, 27/28 lb.	Hawkes Bay or Poverty Bay
Irish Short-seeded "Ben", 32/33 lb.	New Zealand Machine-dressed
Victorian Western District	Italian (Annual)
Westernwolph's True Strain	

Best by "results," Brunning's Seeds have a reputation of over 79 years for reliability. It pays to use the Best Seeds.

CATTLE PUMPKINS

Ironbark	Crown
King of the Mammoths	Turk's Cap
Triamble	Connecticut Field

BRASSICAS

Thousand-headed Kale	Chou Moellier
White Mustard	Giant Kangaroo Rape
Holland Grown and English Grown Dwarf Essex Rape.	

MISCELLANEOUS SEEDS

Silver Beet, Plain Leaved	Silver Beet, Lucullus Curled
Linseed or Flax	Japanese Buckwheat
Canary Seed, Plain or Mixed	Broom Millet
Johnson Grass	Sunflower, Black and Grey
Sheep's Burnet	Peanuts for Sowing
Panicum, Hemp, Maw, Inga, Red and White Millet and Bird Seeds Generally.	

VEGETABLE SEEDS

Beet Red, Crimson Globe	Pea, Day's Early Sunrise
Beet Red, Incomparable Turnip-Rooted	Broad Bean, Carter's Leviathan
Parsnip, Hollow Crown	Carrot, James Intermediate
Onion, Brown Spanish Long Keeping	Carrot, St. Valery
Onion, Early Brown Globe Improved	Carrot, Chantenay
Onion, Brunning's "Perfect" Long Keeping	Carrot, Short Horn
French Bean, Canadian Wonder	Lettuce, Brunning's New York
French Bean, Epicure Runner	Lettuce, Brunning's Iceberg
French Bean, Kentucky Wonder	Pea, Brunning's English Wonder
French Bean, Magnum Bonum	Pea, William Hurst
French Bean, Scarlet Runner	Pea, Witham Wonder
Pea, Brunning's Greenfeast	Pea, Richard Seddon
Turnip, All Table Sorts	Pea, Dwarf Defiance
	Pea, Stratagem
	Pea, Yorkshire Hero
	Pea, Little Gem

For Fuller Particulars of Vegetable Seeds carried in stock as well as for prices in $\frac{1}{4}$ lb., $\frac{1}{2}$ lb. and 1 lb. lots or in the case of Peas and Beans of $\frac{1}{4}$ bush., $\frac{1}{2}$ bush. and bushel parcels, kindly write to Brunning's Sales Dept., Box 857 K, Melbourne.

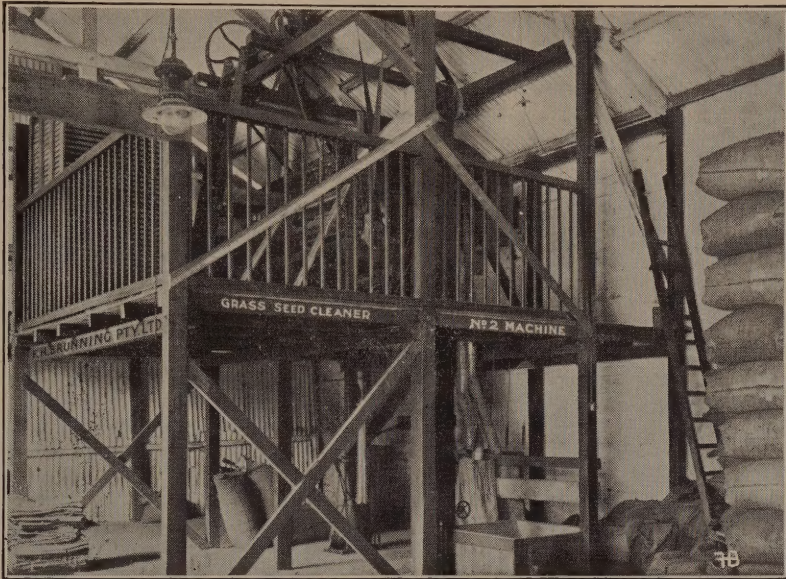
CARE IN BUYING SEEDS

Before buying Farm Seeds, Whether Grasses, Clovers, Lucerne or Annual Fodders, every farmer should carefully consider the following five items:—

The following points with respect to the purchase of Grasses, Clovers and other fodder seeds should be considered by all farmers:—

- (1) **Suitability for district, particularly as to kind and variety.**
- (2) **Freedom from and resistance to diseases.**
- (3) **Quality.**
- (4) **Purity.**
- (5) **Germination.**

It is very probable that most growers consider the first before buying, but with regard to the others, it is certain that they are frequently overlooked. Progressive farmers, who recognise the importance of better and more profitable crop production, must realise, however, that the careful selection of seed under the points above enumerated is worthy of their attention.



Brunning's Special "Clipper" No. 2 Grass Seed Cleaning Machine.

This article is written with the purpose of encouraging farmers to buy and use the best seeds, also to convince them that they have no justification whatever for buying and using low priced and inferior seeds with a high proportion of weed seeds. The main points to be borne in mind are:—

- (1) Seeds of some crops are unavoidably mixed with seeds of some undesirable weeds, which, when sown may gain the upper hand and reduce the stand of the main crop, consequently they will necessitate labour and expense in eradication to prevent permanent injury to the farm.
- (2) Old seed, which may have a low germination capacity, results in a poor crop, the field having throughout only scattered plants.
- (3) Seeds may have low germination capacity, due to—
 - (a) Unfavourable conditions during the development, harvesting, and storage of the seed; or
 - (b) Seed that has been kept too long, i.e. old age.
- (4) Seeds of certain crops such as certain Clovers, Grasses, etc., offered for sale usually come from overseas countries which may have a vastly different climate to that under which they would be grown in this State, the ultimate results being reduction in yield of crop and carrying capacity of the pastures.

In the selection of seeds the following points should be looked for:—**Size, colour, plumpness, brightness (and occasionally smell),** but it is not always easy to judge by the eye. **Something more than good appearance is needed,** and that is **high percentage purity and germination.**

In conclusion, the following points should be given careful consideration:—**Buy on tested samples and obtain a statement as to percentage purity and germination,** which will tell what proportion of the bulk of the seed is true to name; note the nature of the impurities and especially the amount of weed seeds present. The germination will show the percentage of pure seeds which are capable of growth.

Avoid low priced seeds unless there is definite proof to show they are good, as low prices and inferiority generally go together.

LAYING DOWN AND MAINTAINING LUCERNE

The value of Lucerne as a wealth bringer is too well known to the agriculturist to need much comment here. Where grown under reasonably congenial conditions, the "King of Fodders" is highly productive, **can be cut for green feed, makes excellent silage, and if used judiciously is an excellent pasture plant.** Its greatest value however, is in the **hay** which is of the **highest quality**, more digestible than most forms of rough food as well as highly nutritious, and what is also extremely important, **easily cured.**

With such a wide range of utility, it is not difficult to understand why Lucerne is one of the leading perennial fodder plants of Australia.

Lucerne is a member of the medicago family and is thus related to the English Trefoil or Black Medick Clover, as well as to our own Native Trefoils or Burr Clovers, *M. Maculata* and *M. Denticulata*. As a member of the leguminosae family it is a nitrogen gatherer and a soil improver, and even when laid down only temporarily for three or four years, **leaves the land in better condition** than when it was originally sown. This is an added value in view of the pasturage and hay yielded during that period.



Cutting a Good Stand of Brunning's Lucerne.

CLIMATIC ADAPTABILITY:—Lucerne has been successfully established and proven in every State in the Commonwealth, and in such widely apart districts as Northern, Midland and Southern Tasmania, in various parts of Gippsland such as Bindi, Ensay and Bairnsdale, in and around Sale and Maffra and at Buln Buln, in the Western District of Victoria, at Werribee and Bacchus Marsh (near Melbourne), and in the North-Eastern Parts of Victoria, to say nothing of the extensive areas being grown under irrigation in the Goulburn Valley, Bendigo, Swan Hill, Cohuna, Rochester, Echuca, and other Northern and North-Western Districts in this State. In addition, it is extensively grown in Queensland, in the dry Northern areas of South Australia, in and around Hallett, Koorlinga, Burra, Jamestown and Yarcowie, as well as in the River Murray settlements in that State. There are many acres of Lucerne in Western Australia, while the term "Hunter River" is sufficient significance of the thousands of acres under this fodder in practically every settled part of New South Wales.

Further testimony to the wide climatic adaptability of this plant is hardly necessary and as it is a **payable crop where the soil conditions are right**, Lucerne is worthy of the attention of every farmer.

VARIOUS TYPES:—There are several varieties, or more correctly speaking, strains of Lucerne, the principal of which are the **French Provence, Chinese, and Grimm.** The **French Provence strain is the original** of both the Australian Hunter River and the New Zealand Marlborough Lucernes. The **Chinese** is a recently introduced type, which is still in the experimental stage, but which **has already given excellent results** in the trials at the Waite Agricultural Institute, Adelaide, and, owing to its hardness to drought and cold, and its high yielding value, is a strain which must play a prominent part in the agriculture of Australia should further extensive experiments now being carried out continue to support the evidence already obtained. **The Grimm Lucerne** is a type most hardy to cold weather and one showing a greater proportion of stem than leaf. There are very few places in Australia where Grimm Lucerne can be recommended in preference to the French Provence strain. In addition, there are a number of dry weather types,

LUCERNE. (Continued.)

which are put on the market from time to time as possessing special virtues, but for Australian conditions the Hunter River and New Zealand Marlborough will be found to fill most requirements. **Later on**, when it has been tested, and proven beyond doubt to be superior to or even equal in yield to the French Provence type, **the new Chinese Lucerne will demand much greater attention.**

ESSENTIALS TO SUCCESS:—The essentials for growing a successful and profitable stand of Lucerne may be briefly summarized as follows:—

Thorough sub-soiling.

Proper and complete soil preparation.

The use of Lime when preparing the ground.

Adequate manuring in the shape of top-dressing.

Well and thoroughly drained land.

Frequent cultivation.

Efficient grading.

Effective watering (where grown under irrigation).

And last but not least:—

The sowing of reliable, healthy, vigorous, machine-dressed seed, free from dodder and other noxious weeds.



Thorough subsoiling and efficient soil preparation are necessary to grow Lucerne successfully.

SUB-SOILING:—Lucerne being a deep rooting plant, reasonably deep land is necessary to establish a payable and permanent stand. Although the roots have great penetrating power it is necessary that they be enabled to get down to the lower strata of earth by a deep stirring up of the stiff sub-soil. On true river flat Lucerne land, such as is experienced in many parts of New South Wales, such thorough sub-soiling should not be necessary, but in ordinary Lucerne Country, this operation is most essential, as, if the plant cannot send its roots down into the lower soil strata, it is unable to withstand drought and to persist as a true permanent pasture. **Lack of sub-soiling** or neglect to break up the lower strata of ground **prevents the roots** from penetrating right down and forces them to run along the surface soil, thus impoverishing the plant by depriving it of the foods contained in the sub-soil, and at the same time rendering it liable to be burnt out in dry, hot weather.

LIME:—As one of the necessary plant food constituents, **Lime is essential in any land** from which a good crop of Lucerne is to be expected. Lime also tends to liberate from its insoluble form of combinations another essential plant food substance in Potash, and, at the same time, converts it into a condition in which it is readily available to the plant as food; it is also essential to the development of the micro-organisms which bring about the formation of nitrates in soils, and in addition it is necessary to neutralise the acids that are naturally formed in the process of decay of the organic matter present in soils.

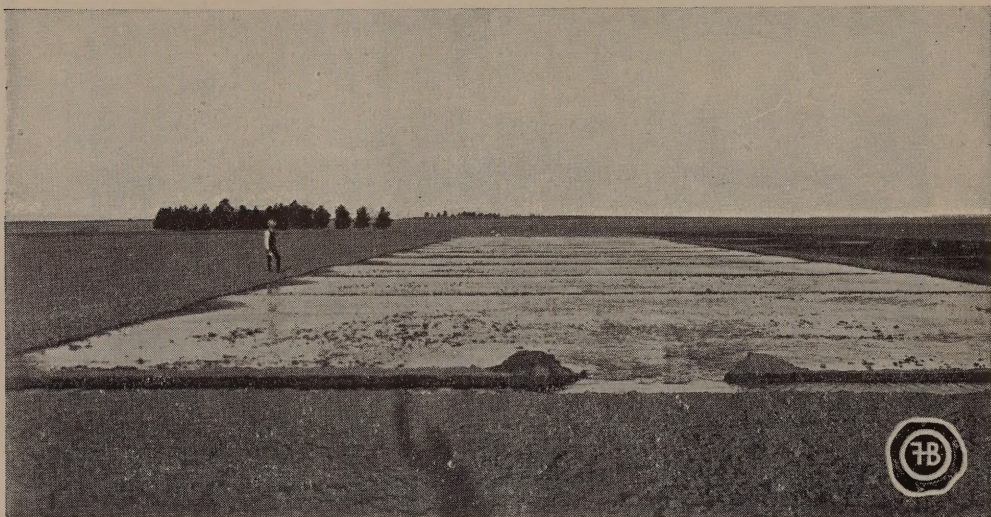
MANURE:—Fertiliser may be applied at the time of preparing the ground, but at least four weeks after applying Lime, or mixed with the seed and the two sown together at the one operation. **As a rule, Superphosphate** at the rate of 112 lbs. to 140 lbs. per acre will be found the **most effective.** Australian soils, being more deficient in Phosphorus than in the two other essential elements, Nitrogen and Potash, the Superphosphate supplies the necessary balance. These remarks apply only to Manure at time of sowing the seed, but top-dressing an established stand will also be found a remunerative and profitable investment. This will be dealt with later on.

SOIL PREPARATION:—After sub-soiling, it is **necessary** to make a **good seed bed**, because Lucerne is a small seed and unless the land is properly worked up for sowing, a large quantity of seed is liable to be buried, and a patchy stand will result.

LUCERNE. (Continued.)

To prepare the ground, plough as deeply as possible without bringing clay to the surface, and follow in the furrow with sub-soiling plough, set from 12 to 14 inches deep. This depth of loose soil will enable the young plants to root well, and, where irrigation is practised, will enable the applied water to soak down. Bacterial action, so essential to the healthy growth of Lucerne, takes place chiefly within from 12 to 24 inches below the surface, hence the necessity for having this layer of the soil in good physical condition. **Just before the seed is sown**, plough the land again, then harrow and roll. **A firm, fine seed bed is essential**, and to bring the soil to the requisite fine tilth, it may be necessary to roll twice. When broadcasting the seed, run a pair of harrows lightly over the compacted soil just prior to seeding. If weeds or grass are still present, they should be worked out with a spring-tooth cultivator, and removed. The ground will then be ready for sowing the seed.

DRAINAGE:—Thorough and adequate drainage is absolutely necessary, and if the soil is not naturally drained to a depth of at least several feet, this deficiency must be attended to before Lucerne growing is attempted. Where badly drained patches occur in a field, it will be noticed that the Lucerne soon dies out, and is replaced by weeds. The plants are not affected by flood water, unless submerged for some time, but water must never be allowed to lie on Lucerne for any length of time, and to cover a field for two or three days will surely mean killing it out. **Lucerne will not stand "wet feet."**



Efficient Grading ensures Uniform Watering.

GRADING:—At this stage a word on the subject of grading where Lucerne is grown under irrigation will not be out of place. **Efficient and correct grading is most necessary** to ensure an even and uniform watering of the crop, and to prevent the moisture collecting in depressions and thereby killing out the Lucerne, with the result that the stand becomes patchy. Bad drainage is even more harmful to Lucerne than lack of moisture, or the worst weather conditions.

WHEN TO SOW:—Lucerne seed may be sown both in the Spring and the Autumn, according to the rainfall, the climatic conditions, and whether irrigation is available or not. Where irrigation is not available, **Autumn sowing is the best** for hot, dry districts, with a light Summer rainfall and a mild Winter; **where facilities for artificial watering are available**, under such climatic conditions, **seeding may be carried out either in the Autumn or Spring**, although the latter is, if anything, preferable, as, with the advent of warm weather, the young Lucerne plants grow rapidly, and soon out-distance any weeds that may have survived the preparatory cultivation of the ground. **For districts such as Gippsland**, with a colder Winter and more regular Summer rainfall, **Spring sowing** will generally give the best results, but it does not necessarily follow that this rule is invariable, and splendid stands have been secured both there and in other cooler parts of Victoria from early Autumn seedings. Autumn sowings must be carried out early in these districts, to allow the young plants to become thoroughly established before being called on to withstand cold weather, and **where circumstances necessitate late seeding, from 20 lbs. to 30 lbs. per acre of Algerian Oats as a nurse crop** will help to protect the young plants, although, except under a few special conditions, such as the preceding, it is better to sow Lucerne without a nurse crop. On the other hand, while Spring seeding is preferable in the Northern areas of Victoria, where irrigation is available, **seed sown in the Autumn enables the plants to become thoroughly established** during the Winter and early Spring, before being called on to withstand the dry Summer weather, and, to a great degree, economises in the number of irrigations necessary. **Another advantage is that an Autumn sown crop** in these districts can be utilised to a considerable extent during the first Summer, while Lucerne sown the previous Spring must be treated lightly until more thoroughly established.

LUCERNE. (Continued.)

QUANTITY TO SOW:—The amount of Lucerne seed required to sow an acre varies according to the quality, soil, and weather conditions. An average seeding of **Farmer's Dressed Seed** is about **25 lbs. broadcast**, and **15 lbs. per acre drilled**, while of **Brunning's Supergrade M/Dressed and Tested Quality** from **16 to 20 lbs. broadcast** and **10 lbs. per acre in drills** would be required for the same area. The value of **Brunning's "STANDARD" Quality A1 Hunter River Lucerne** can therefore be appreciated because, sown in drills as small a quantity as **6 lbs.** will be sufficient for an acre, thereby effecting a saving in the amount of seed used which means a lesser cost for seed per acre, as well as ensuring freedom from dodder and other noxious weeds. It is, however, a mistake to risk a good stand by stinting the seed, and unless the Lucerne grower has had sufficient experience in sowing to utilize the seed to the fullest extent, it is advisable to **sow 6 lbs., but not more than 8 lbs., per acre of this high-grade Lucerne.**

It will thus be easily understood that the quality of seed not only makes a very considerable difference to the quantity required per acre, but that the **highest grade seed is the cheapest in actual cost per acre.**



Lucerne paddocks at Coolah, N.S.W.

Full particulars and prices of Brunning's Giant Upright Broadleaf Hunter River Lucerne, post free on application.

HOW TO SOW:—Lucerne seed may be sown both broadcast and in rows. Broadcast sowing enables the plants to cover the ground evenly, and gives the weeds a lesser opportunity of obtaining a foothold, and for many reasons is preferable to drilling, but, of course, more seed is required per acre than when sown in rows. The **most economical method of broadcasting** Lucerne is with a **Cahoon Hand Seed Sower**, which will broadcast evenly any desired quantity of seed at the rate of from 4 to 5 acres per hour.

Where desired to save an unnecessary operation, **seed and manure may be sown together**, whether drilling or broadcasting. The seed and manure **should be mixed immediately prior to sowing, and on no account allowed to remain standing mixed** for any lengthy period, otherwise the Superphosphate is liable to burn the seed, and thus impair its germinating powers. From $1\frac{1}{2}$ to 2 hours is a reasonably safe limit, but the latter time **cannot be exceeded** with safety.

Broadcast sowing precludes the possibility of cultivation, and is only feasible where irrigation is available, or in districts with a good Summer rainfall, and except in very dry districts and without irrigation, seed is now more uniformly sown in **rows about 7 inches apart**, using a seed drill. By this method, less seed is necessary per acre, and cultivation may be more easily practised.

Deep seeding is not conducive to good results, and care must be taken when drilling Lucerne seed to see that it is **not planted too deeply**, as even if only covered very lightly, it must lie in a furrow, and beating rain may wash the ground over it, burying it to a greater depth. It is, therefore, always necessary to **be careful to sow shallow when drilling**. After seeding has been completed, whether broadcasting or drilling, it is **necessary to roll** to compact the soil around the seed, and **THIS ROLLING AFTER SEEDING IS ESSENTIAL TO SECURING A GOOD STRIKE.**

NECESSITY FOR GOOD SEED:—Good seed with Lucerne means the best strain for the particular climatic conditions, seed absolutely free from dodder and other noxious weeds, and of good germination. The strain which is so well and favorably known throughout Australia is the French Provence type acclimatised in the Hunter River, Tamworth and other Lucerne growing districts in New South Wales, and is the **giant broad-leaved, upright growing type generally known as the Hunter River**, which yields a greater bulk of fodder than any of the other varieties. As this particular type can be grown throughout Australia, and is superior to the other strains, these need not be further discussed here.

LUCERNE. (Continued.)

In addition, therefore, to using the true, broad-leaved, upright strain of the above type, the seed must be of **good germination**, and furthermore **CLEAN**, that is to say, **absolutely free from dodder and other noxious weeds**. The farmer knows the damage and injury done by dodder, but there are many other weeds to be found in uncleaned Lucerne Seed, which are almost as dangerous. **Farmer's Dressed Seed** means seed as received direct from the farm, without being screened or Machine-dressed, and merely winnowed by the grower. **Machine-dressed** seed means seed that has been cleaned once by machinery over a fine sieve.

BRUNNING'S SEED BEST:—Bunning's Lucerne seed is saved from healthy, vigorous crops growing in dodder-free paddocks, and is then treated by means of the latest and most up-to-date machinery to ensure the elimination of other noxious weeds. Bunning's "STANDARD" A1 Quality Hunter River Lucerne means seed that has been triple-machine dressed by the latest and most up-to-date machinery, and brought as near perfection as possible.



Bunning's Special Lucerne Dressing Machine. The finest of its kind in Australia.

It represents the acme of perfection in Lucerne seed, and the highest grade obtainable, having under test a germination of over 98 per cent., and a purity of practically 100 per cent. For the protection of purchasers, Bunning's "STANDARD" A1 Quality Lucerne is only supplied in sealed calico bage, each containing 28 lbs. nett weight of seed, except where an odd quantity is required, when it is packed accordingly, but Bunning's "STANDARD" A1 Quality Lucerne is never sent out **unless under seal**. Where a full sack of this Lucerne is ordered, six calico bags are packed in each double sack, making a total nett weight of 168 lbs. of seed per sack. Owing to the high purity and excellent germination, a lesser quantity of Bunning's "STANDARD" A1 Quality Lucerne is necessary to sow an acre thoroughly than seed of lower quality.

Bunning's Second Grade of Hunter River Lucerne, which is known as "Supergrade" Double Machine-dressed, may be regarded as **equal to the best sent out by most other houses**, and in many cases it is **much superior**. It is not equal to "Standard" Quality, but is a **particularly choice line**, which can be sown with every confidence.

Bunning's Choice or Prime Machine-dressed Hunter River Lucerne is also very good quality seed, but not equal to the two grades previously mentioned.

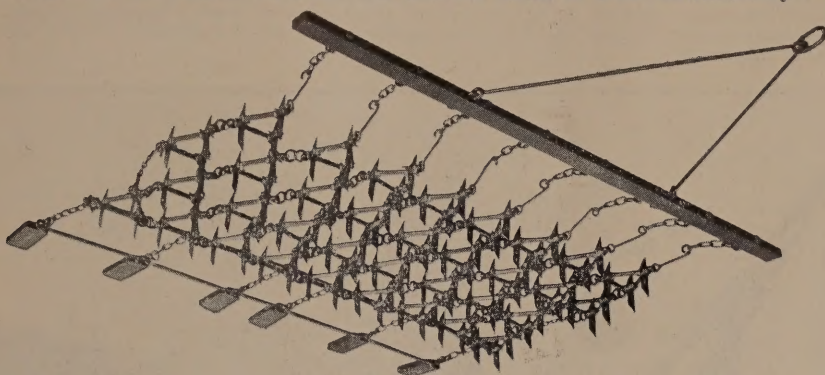
TREATMENT AFTER SOWING:—After the seed is sown, the weeds must be kept in check, and while a light harrowing might be of advantage, it is always risky at this stage, and must not be attempted until the Lucerne roots have obtained a fairly firm hold. **The best method of checking early weeds**, which compete with the Lucerne, is to **mow frequently**, putting the mower over the crop before any of the weeds have commenced to seed, and, if necessary, repeating the operation about a month afterwards.

Make the first cut before the Lucerne has reached the flowering stage, as in addition to keeping down the weeds, **early cutting** helps to establish the roots, and to **make the plants stool out**. The first cutting makes excellent hay, or can be used for green feed, as required. Do not mow too close to the ground at any time, but always leave a few leaves. After the second cutting has been taken, particularly on ground which sets hard, the harrow can be used. **Do not pasture** Lucerne during these early stages of growth.

LUCERNE. (Continued.)

CARE OF ESTABLISHED STAND:—When thoroughly established **Lucerne** thrives on very frequent cultivation, and from the time the plants are two years old and onwards, cultivation can be carried out very freely, using a disc harrow with the discs set rather straight and the harrows weighed to cause them to sink to the right depth. This cultivation is valuable in conserving moisture, as the loosening of the surface allows the water or rain to percolate to a greater depth, and prevents waste by running over the surface, as well as minimising loss through possible evaporation.

Cultivation also thickens the crop, as the splitting of the crowns by the disc harrow encourages stooling, and no fear need be entertained that the operation at this stage will injure the plants, as they are too strongly rooted to be harmed by surface cultivation. Where a disc harrow is not available, an ordinary spring tooth cultivator can be used just as effectively, and for moist ground one fitted with special narrow tines is most satisfactory.



Sunblade Harrows, which do excellent work in Lucerne Cultivation and Renovation.

In districts where irrigation facilities are available, it is a good practice, after feeding down the Lucerne and giving it an irrigation, to broadcast a bushel of Algerian Oats per acre in the crop. A deep scarifying will suffice to cover the Oats, which will grow up with the Lucerne, thus providing an abundance of useful fodder during the Winter, when the latter is dormant, while if the stock are removed from the field in September, and the crop permitted to mature, the Oats can be cut for hay and make a valuable reserve of fodder for any kind of stock. The best time for sowing the Oats is in the early Autumn. After cutting the oat hay, irrigate the ground and scarify again. The cultivation and the Oats help the Lucerne, while the Oats grow more freely, owing to the fertilising qualities of the latter.

In the second and subsequent harvest years, Lucerne is usually cut two, three or even four times, for hay or for green feed, but **frequent cutting has the effect** of diminishing the persistency of the stand, and even under the most favorable conditions, more than three cuts will tend in this direction, while under conditions less suited to Lucerne cultivation, it is not advisable to cut more than twice each season if it is desired to maintain a long duration stand.

BENEFITS OF TOP-DRESSING:—It has now been conclusively proved that the following benefits are derived from top-dressing established Lucerne pastures with Superphosphate.

- (a) The yield of Lucerne is increased.
- (b) Old established stands are rejuvenated.
- (c) The more vigorous growth enables the Lucerne to smother the undergrowth of weeds.
- (d) The feeding value of both the green fodder and the hay is much improved, thereby benefiting the health of stock.
- (e) The growing period is extended, making feed available in the late Autumn and early Winter, when it is most valuable.
- (f) The life of the pasture is undoubtedly prolonged.

The amount of Superphosphate to be applied **should not be less than 112 lbs. per acre**, but even as much as 448 lbs. per acre may be used with correspondingly increased benefits from the extra outlay. Remember, **you can only take out of the soil what you put into it**, and that the increased yields from top-dressing well repay any expenditure incurred thereby.

In Northern Victoria and similar climates where Lucerne is grown under irrigation, from the **middle of July to the end of August** will be found the most suitable period, but in districts such as Gippsland, where natural rainfall is relied on, **September** will be found a more suitable month. The point to bear in mind is that the most payable time to top-dress is just before the advent of milder weather in the early Spring starts the crop into growth. Some successful Lucerne growers use from three to four cwt. per acre under irrigation, **making the first application of about 168 lbs. per acre in July, the next of 168 lbs. per acre a month later, finishing up with a final application of 112 lbs. per acre late in September or early October.**

LUCERNE. (Continued.)

CUTTING FOR HAY:—The time to cut Lucerne for hay is just when it is coming into bloom, that is to say, not more than 10 per cent. of the crop should be in flower, and as at this stage the second growth is commencing to show, it is obviously unwise to destroy the basis of the succeeding crop. Experienced growers prefer to judge the time to mow their Lucerne by the height of the second growth, which should not be more than an inch or two.

The first cutting of the season should take place **before flowering** has commenced. In warm, dry climates, cut, rake and put the Lucerne into stooks all in the same day, allowing it to remain in the stook for one day only (unless wet weather sets in) before proceeding with the stacking. Drying is a very rapid process in warm, dry climates, and delay will inevitably result in loss of the succulent leaves, and as the valuable part of Lucerne is its leaf, care must be taken in all haymaking operations to conserve the foliage. In moister climates, curing will, of course, take longer, and allowance must be made accordingly. Stack the Lucerne under cover, as the quality of the hay is thereby improved.



A Convenient Method of Stacking Lucerne Hay.

Prices of Lucerne, Grasses, Clovers, and other Agricultural Seeds will gladly be furnished on application. Address your letter to Brunning's "Service" Dept., Box 857K, Melbourne. No charge is made for advice or information.

DODDER:—This noxious scourge is the greatest enemy of Lucerne, and although the use of **Brunning's Specially Clean Dodder-Free Seed** will to a great extent keep it out of Lucerne paddocks, there is always the danger, especially on land which has previously been seeded to Lucerne and affected with Dodder, that it may have been allowed to seed.

Seed of Dodder retains its germinating powers for several years, and has been known to lie dormant in the ground for a lengthy period, so that it appears in the crop although not actually present in the seed sown. This is a very important point, and again emphasises the necessity for using only properly cleaned, reliable seed. The Dodder in the earlier stages of growth appears similar to a thread-like vine, and the young plants attach themselves to the Lucerne seedlings. As soon as this thread-like vine is firmly attached to the Lucerne Plant, the stem connecting it with the ground withers away and the Dodder draws its sustenance from the Lucerne by means of tiny suckers which enter the tissues of the host plant. Dodder grows very rapidly, forming tangled masses with its yellow stems, and soon chokes out the Lucerne. The flowers are of a bright golden yellow. **As soon as there is any suspicion of Dodder appearing in a Lucerne or Clover field, send us samples of the plants** and we will be glad to identify and recommend remedies for its eradication. On no account allow the Dodder to seed, as this only prolongs and spreads the trouble.

"MESGAWI" BERSEEM CLOVER

The Winter Lucerne.

Brunning's "Mesgawi" Berseem Clover is a valuable and useful annual Winter and Spring fodder first introduced from Egypt some fourteen or fifteen years ago, since then it has achieved considerable popularity in Australia, having been successfully grown in Western Australia, South Australia, Tasmania, New South Wales and many parts of Victoria. Successful results have been had with Berseem Clover in this State in as widely apart districts as Lindenow, Swan Hill, Rochester, Kerang and elsewhere, both with and without irrigation. One gentleman at Lindenow (near Bairnsdale), in the one season grazed 18 cows as often as four different times on five acres, so this speaks for the carrying capacity of the plant.



"Mesgawi" Berseem Clover.

UTILITY:—Brunning's "Mesgawi" Berseem Clover can be **used for pasture, cut for green feed, or ploughed under as green manure** to improve the soil, and is particularly valuable in the latter respect, especially as a predecessor to Lucerne. It is an **excellent crop for cleaning land** as the frequent cuttings destroy weeds, and although it is a good pasture plant, much better results are obtained by cutting and feeding green, stock being liable to trample down and damage the plants while grazing, thus materially injuring the prospects of succeeding growths. Although Berseem is not recommended for the purpose, it yields a hay of very fair quality. It **does not taint milk or butter** when used as green fodder, and although it is of course necessary to take the usual common precautions against blowing, no cases of bloat due to "Mesgawi" Berseem Clover are on record. For the sake of safety, however, it is always advisable to give stock a feed of chaff or hay before putting them in on a Berseem paddock, especially when it is wet with rain or dew.

WHEN TO SOW:—To secure the maximum results, **early sowing and thick seeding** is necessary. Where conditions permit, **sow in February**, but certainly not later than the end of March, although in warmer districts with a mild Winter climate seeding may be carried out with success as late as the end of April. It will easily be understood however, that an annual completing its life in one season, **cannot be expected** to yield as heavily from late as from early sowings as the period of growth is much shorter when sown late than when seeded early.

"MESGAWI" BERSEEM CLOVER. (Continued.)

SOIL REQUIREMENTS:—Berseem is adaptable as regards soil, and successful results may be expected from any land that will grow Lucerne well **providing there is plenty of lime in the ground.** Where this element is lacking, a good heavy liming is necessary before proceeding with the soil preparation. **Good drainage is essential** and the ground must be thoroughly broken up and pulverised so that there is no hardpan or impervious subsoil to check the growth of the plant.

Bone Dust and Superphosphate mixed used at the rate of from **112 lbs. to 168 lbs. per acre** according to the state of the soil will be found the most suitable fertiliser. Superphosphate alone will give the results as far as the Berseem alone is concerned, but the value of the Bone Dust will be evident with the succeeding crop.

On no account attempt to grow Berseem without proper soil preparation, but follow the **same method** as you would in preparing the ground **for Lucerne**, that is, provide a **properly prepared seed bed** thoroughly worked and brought to a fine tilth.



The above crop was sown on March 11th, has been cut twice, and is now practically ready for a third cut. The grower says: "The secret of success in growing this crop, is to have the seed in early." This photograph was taken early in July.

METHOD OF SEEDING:—Berseem is sown both **in drills 8 inches apart** and **broadcast**, and both methods have given excellent results. Be particularly **careful to sow shallow** so as not to bury the fine seed, as deep seeding means a poor stand and weakly stunted plants. This precaution is very necessary when drilling. As thick seeding is essential to good results, a fair average sowing per acre **in drills 8 inches apart** is from **8 to 10 lbs.** of seed, but when **broadcasting**, from **15 to 20 lbs.** will be required for the same area. After the seed has been sown, whether broadcasted or drilled, **the ground must be rolled** to firm and compact the soil around the seed. This rolling after sowing is most imperative.

IRRIGATING:—When growing Berseem under irrigation give the ground a good watering some days before sowing, then complete the seeding as soon as it is possible to get on the ground. **On no account irrigate** again until the seed is well through and the plants have got a hold on the ground, otherwise the seed is apt to be washed and a patchy stand will be the result.

SUBSEQUENT TREATMENT:—In the first growth, Berseem sends up a single stem, carrying several leaves, but no side branches. When the plants are from 9 to 12 inches high, **take a cutting.** By this time, three or four side shoots will be showing at the base of the original stem. The **cutting encourages the growth** of these side shoots and causes the plant to stool out. After this first cutting, the side shoots grow rapidly, and replace the first stem, so that under satisfactory conditions, the second growth will be much thicker and denser, and will give a much heavier bulk of feed than the first. Four, five and six cuttings will be secured in a single season, especially where Berseem is grown in districts with a mild Winter, either under irrigation conditions or on moist ground. Seven cuttings are not exceptional, and one gentleman in the Bendigo district secured nine matured cuttings during 1920 from seed sown in the February of that year.

BERSEEM AND CRIMSON CLOVER:—For Australian conditions Berseem has been generally proved to be superior to Italian Scarlet or Crimson Clover (*Trifolium Incarnatum*), but there are certain districts with severe Winter climates where Crimson Clover gives more successful results—although only for late Winter and Spring fodder. Generally speaking, Berseem will be found a much superior proposition.

MIXTURES:—"Mesgawi" Berseem Clover gives excellent results in mixtures and can be sown this way with Skinless Barley, Italian Ryegrass, Tick Beans, Algerian Oats and Rye Corn. Space does not permit the detailing of these mixtures but full particulars will be given on application to **BRUNNING'S SERVICE DEPARTMENT, BOX 857, MELBOURNE.**

BRUNNING'S GENUINE GIANT COLONIAL COWGRASS

What it is and how to establish and maintain.

The value of **Brunning's Genuine Giant Colonial Cowgrass** as a permanent pasture, and the fact that the plant is still comparatively unknown and in many instances, therefore, confused with the ordinary Biennial Red Clover—often erroneously known as Cowgrass—necessitates more publicity being given, especially in view of the **wonderful** results which have already been attained throughout Gippsland and in other parts of the State. From a Spring sowing, a cutting of green feed would be ready about the middle of December, and if the crop is left for this purpose, at least, two more should be obtained before the end of April. Where sown in the Autumn under anything like reasonable conditions, it should be possible to obtain, at least, four cuttings in a season. As a Hay plant it is also a good proposition, giving from 1 to 1½ tons per acre from the first cutting of the first season's growth, and naturally larger yields from subsequent cuttings. One Soldier Settler in the Poowong District obtained as much as 26 tons of cured hay off 8½ acres on the second season's growth.



Good Growth of Giant Colonial Cowgrass coming on as an aftermath after a hay crop taken off in November.

CLIMATIC ADAPTABILITY:—The suitability of the plant to all parts of Gippsland as well as the Western District of Victoria has already been demonstrated, and there is no question that Giant Colonial Cowgrass will prove most valuable for many parts of New South Wales, South Australia, the South West of Western Australia, and Tasmania. It therefore possesses a very wide range of adaptability with the advantage that it can be grown under conditions unsuitable for Lucerne, and will without doubt become more largely used as its valuable qualities are known and appreciated.

COMPARISON WITH RED CLOVER:—The true Genuine Giant Colonial Cowgrass (given the right methods of treatment) is a permanent pasture plant, remaining at a high state of productivity for five or six, or even ten years, while the ordinary Red Clover is, at the best, a biennial, although a few plants here and there may persist for three or four years. The genuine Giant Colonial Cowgrass is a stronger taller growing plant, making considerably more growth than Red Clover and being a much higher yielder. These are facts which must be taken into careful consideration when purchasing seed, especially where only a temporary ley is required, as the ordinary Red Clover, which is several pence per lb. lower in price, may very often fill the actual requirements of the moment. In most instances the expert has little difficulty in detecting the difference between these strains by the seed, but the best guarantee of genuineness is, as with all seeds, to buy one's requirements from a reliable, reputable legitimate Seedsman. **Brunning's** strain of **Genuine Giant Colonial Cowgrass** is the surest and most satisfactory to purchase.

BRUNNING'S GIANT COLONIAL COWGRASS. (Continued.)

UTILITY:—Giant Colonial Cowgrass is a plant of especially high feeding value and is suitable for grazing, cutting for green feed, or for a hay crop. The Senior Dairy Inspector of the Victorian Department of Agriculture, Mr. R. T. Archer, in a departmental bulletin, "Feeding Cows for Milk Production" gives the following comparative values on the green fodder and hay:—

GREEN FODDER

Cowgrass, value per ton	£1 14 0
Lucerne, value per ton	£1 6 0

HAY

Cowgrass, value per ton	£3 17 8
Lucerne, value per ton	£4 18 0

Giant Colonial Cowgrass is one of the most valuable crops that has been grown in Gippsland and on the South Gippsland line from Loch to Yarram,



Brunning's Giant Colonial Cowgrass on the property of
Mr. C. H. Henning, Hamel, W.A.

A Western Australian Experience of Giant Colonial Cowgrass.

Hamel, Western Australia,
7th January, 1931.

"Your Genuine Giant Colonial Cowgrass was brought before my notice by Mr. Strang, late of South Australia, who advised me where he considered it would do best. The seed was broadcast during the second week of May, at the rate of 4 lbs. per acre, following the sowing of a bushel of Perennial Ryegrass. The ground had grown Potatoes (irrigation crop) during the two preceding years, and as this entailed about a ton of "D" Potato Manure with each crop, I did not use Superphosphate.

Owing to an exceptionally wet Winter, and also floods, about four acres of Cowgrass did not germinate, but the Ryegrass came away well. In the other four acres the Ryegrass did not germinate, but the Giant Colonial Cowgrass came away well. I am enclosing two snaps of it. (See illustration shown above on this page). These were taken after 3½ weeks of grazing by ten cows (Dec. 16). I also cut half an acre during the first week of November, but when it grew again to 9 inches to a foot, I also grazed this. It has not been irrigated up to the present as there is sufficient moisture in the ground to keep it growing well.

It has previously been my custom to feed chaff and concentrates to my cows, but since grazing on the Giant Colonial Cowgrass I have found it waste of money to provide this additional feed as I obtained no extra milk thereby. I certainly intend to sow more Giant Colonial Cowgrass this coming year. Some time ago, I wrote you re the type of land I had and also asking for suggestions re suitable grasses. This Cowgrass was sown on the type of land I wrote about. When next sowing, I intend to plow in 5-yard "lands" to allow plenty of drainage during the Winter, and also to provide irrigation channels for the Summer if necessary."

(Signed) C. H. HENNING.

the acreage sown was more than doubled a few seasons ago. Visitors from other parts of Victoria and Interstate have been very much impressed with the wonderful results obtained from this crop, and it is interesting to note that the leading Herd in the Mirboo District Herd Testing Association a year or two ago averaged 296, 83 lbs. Butter Fat per cow. This is striking evidence of the value of Giant Colonial Cowgrass when it is realised that no feed was purchased outside and that the herd was fed exclusively on that grown on the property. These cows were fed on Brunning's Giant Colonial Cowgrass Hay during the Winter months, preferring this to Oaten Chaff or other feed.

BRUNNING'S GIANT COLONIAL COWGRASS. (Continued.)

Giant Colonial Cowgrass can be pastured and many Dairy Farmers prefer to feed off after the first cutting, but cows should only be allowed to graze on it from half to one hour immediately after milking. By following this method better results will be obtained than by leaving the cattle on for a longer period. It is not only valuable for feeding cows for milk production, but is especially suitable for fattening bullocks as well as for feeding horses and sheep.

BLOAT:—When grazing cattle or sheep on Giant Colonial Cowgrass, or for that matter any of the Clovers, there is always some danger of hoven or bloat. **This danger is greatest** when the animals are turned in on the Clover in a ravenously hungry condition, or when it is wet with rain or dew and in a more than ordinarily succulent condition. The chances of "bloat" may be **minimised**, although not altogether eliminated by giving the animals access to other food, such as dry Clover or Lucerne hay before turning them in on the pasture, and also by only allowing stock on for a short period of, say, half an hour to an hour; where the field consists of mixed grasses and clovers, **the danger is always less** in proportion as grasses are abundant in mixture.



An excellent crop of Giant Colonial Cowgrass in flower. This particular field is being grown for seed.

SOIL REQUIREMENTS:—Giant Colonial Cowgrass appears to be very adaptable as regards soil requirements, and will give excellent results on from heavy to light loamy ground. It is not an aquatic, is not suitable for swampy conditions, and requires well-drained ground. For wet country and swamps, "Tarwei" Strawberry Clover or Lotus Major is more suitable.

SOWING THE SEED:—A fine seed bed is essential and it is necessary to work the land well, finally harrowing lightly to compact the soil before sowing. The seed may be sown from the first Autumn rains up to the middle of June, and again from the middle of August up to the end of September, but it is not advisable to sow during the coldest period of the year—from the middle of June to the middle of August. Harrow the ground well before seeding, and when sowing in the Autumn use $\frac{3}{4}$ to 1 bushel of Algerian Oats as a cover crop. Seed may be either broadcast or drilled, and when sowing in March or April use 6 lbs. per acre in drills and 8 lbs. broadcast. When sowing from the end of April to the middle of June use 8 lbs. in drills and 10 lbs. per acre broadcast. For Spring sowing from the middle of August to the end of September, it will not be necessary to use the Oats as a cover crop, in which case sow 10 lbs. per acre in drills and 12 lbs. broadcast. Do not on any account harrow the seed in, either roll it very lightly, or do not touch it at all after sowing. The experience of several Soldier Settlers in Gippsland was that harrowing after sowing, covered the seed too deeply and it did not come through. Satisfactory results will be obtained by not touching the land after sowing, leaving the rain to wash the seed into the well prepared bed. It has been definitely established that Giant Colonial Cowgrass will not germinate unless sown right on the surface.

BRUNNING'S GIANT COLONIAL COWGRASS. (Continued.)

FERTILISER:—For Autumn seeding sow 112 lbs. of Superphosphate per acre with the seed, and then top-dress in the Spring with 112 lbs. of the same fertiliser, the beginning of October being the most suitable time. When sowing in the Spring, it is not necessary to use any manure at the time of seeding, but **early Spring sowings require top-dressings** about the middle to the end of October, with from 168 to 224 lbs. of Superphosphate. The quantities given can only be approximate, and depend entirely on the quality of the land.



From photographs kindly supplied by Mr. S. Hamilton, Dumbalk North, Gippsland. (1) Taking the first cut of Giant Colonial Cowgrass, the 2nd year. (2) 1st cutting of the 2nd year so dense that it must be removed on front of the mower. (3) Carting in Giant Colonial Cowgrass hay yielding $2\frac{1}{2}$ tons per acre. (4) Carting after the 1st cutting of the 2nd year.

SPECIAL FEATURES of GIANT COLONIAL COWGRASS

1. HAS A WIDE RANGE OF SUCCESSFUL CLIMATIC ADAPTABILITY.
2. IMPROVES THE MILK YIELD IN RESPECT TO BUTTER FAT CONTENT.
3. ITS VALUE AS PASTURE OR GREEN FODDER IS HIGHER THAN LUCERNE.
4. YIELDS UP TO THREE CUTTINGS OR FOUR GRAZINGS IN A SEASON.
5. HIGHLY PALATABLE AND NUTRITIOUS TO SHEEP, HORSES, DAIRY COWS AND CATTLE.
6. PROPERLY TREATED THE PASTURE WILL REMAIN IN GOOD ORDER FOR SEVERAL YEARS.
7. CAN BE USED FOR GRAZING, GREEN FEED OR HAY.
8. GIANT COLONIAL COWGRASS IS AN INVESTMENT NOT A SPECULATION.

SUBSEQUENT TREATMENT:—In a normal season from an Autumn sowing the first cutting should be available late in October or early in November, while from a Spring seeding the first cutting will be ready from about the middle to the end of December. **It is preferable to cut rather than to graze the first crop**, but experience has proved that thereafter it will be more satisfactory to pasture, and this may be done in from ten to fifteen days after taking the first cut, the time, of course, varying according to the weather conditions. In order that the Giant Colonial Cowgrass be not too heavily pastured it is advisable, if possible, to cut up into medium sized paddocks so that stock may be moved from time to time, thus giving the Cowgrass every opportunity to recover quickly. There is no other special treatment necessary except the **annual top-dressing** with Superphosphate previously referred to.

BRUNNING'S GIANT COLONIAL COWGRASS. (Continued.)

EXPERIENCES:—Mr. A. J. Walters, Kennedy's Creek, via Laver's Hill, referring to his experience with Brunning's Giant Colonial Cowgrass, writes:—

"I tried a pound or two from you two years ago and sowed about a tenth of an acre on good, fairly heavy soil. I cut it three times last season, and **it did so well** that last Autumn I sowed the paddock (2 acres) with it. I cut a good crop for hay in November last and in seven weeks it was fit to cut again. I am feeding it to the cows now and they like it well (green or hay), and milk very well off it. I measured it a few days ago. Some of the highest was 2 ft. 8 inches and averaged about two feet, seven weeks growth. I noticed a bank in the paddock of a chain or so, it was very light, so that the heavy soil suits its best. What I like about it is its **growth in hot weather when other feed is at a standstill**. I supered it about 150 lbs. to the acre."

Mr. S. Critten, Dumbalk, Gippsland, writing under date of 10th November, 1930, remarks:—

"I can truthfully say that **Giant Colonial Cowgrass is the best and most profitable feed I have ever grown**. The spear Grass is only there for the first cut. Last year there was a lot of it for the first cut but the second cut was pure Giant Colonial Cowgrass. I should have eaten it off with the cows until about now and then I would have had a late cut with practically no Spear Grass. I intend cutting this week. I cut twice last year and then grazed until the end of April. I always harrow the paddocks before shutting up for the Winter and top-dress."

The idea of Giant Colonial Cowgrass lasting only three years is all wrong and I believe that **if it is treated properly, it will last much longer**, provided weeds don't get too strong. Even then the Cowgrass will flourish although the first cut may be weedy, but the first cut finishes the weeds.

Another thing I like about Giant Colonial Cowgrass is that **when everything else has gone it is still there**. I find the main thing is not to eat it at all from the end of April until the middle of July. Ever since I have grown it I have had good grazing from the end of July until the end of September. I then harrow and top-dress and shut the paddock up and it is ready to cut about the second week in November for the first cut. My idea of the best and most profitable results is to grow enough acres of Giant Colonial Cowgrass so as to get enough Winter hay from one crop and then to use it for Summer grazing. **It cuts out the cost of plowing and sowing Summer crops, and I am satisfied that you can't grow anything that will produce more butter fat at the same cost**. Of course, that's what counts with the Dairy Farmers, i.e. low cost of production.

When Giant Colonial Cowgrass fails, everything else fails. Last year I gave my Cowgrass a gruelling test. I cut for the first time on 21st November. We had bad harvesting weather, and before I got it carted in, the green clover was up fully nine inches high. I shut the paddock up until January 14th, and cut for the second time. The caterpillars were very bad. They had taken practically all our grass and had made a start on the Cowgrass. We carted the second cut. The weather was very hot, and we had a spell of dry weather. The Clover started to show green, but the caterpillars kept eating the green shoots until the paddock looked as if it were done. However, **it came again as soon as we got rain** and I had **more grazing from my Cowgrass** than most farmers got from Japanese Millet. I think the idea of not including Giant Colonial Cowgrass with a mixture of Permanent Pasture, a mistake. I always include about 4 or 6 lbs. per acre, and I find that for the first two or three years, it is **the main grass** in the mixture.

Mr. S. Hamilton, Dumbalk North, Gippsland, reports (20/12/30):—

Re GIANT COLONIAL COWGRASS. "I have been sowing your seed now for four years and have not had a failure as every sowing has taken well. Three years last June I saved my first Cowgrass for cutting purposes, on a field of six acres as per photos. Prior to sowing Clover the field had an oat crop taken off and then ploughed and worked in Autumn and Clover sown in June, at the rate of 20 lbs. per acre broadcast on top after a fine harrowing and then rolled down with heavy roller. I find that the ground needs rolling to make the ground solid. This Clover is still in very good condition. As good this year as when sown. It has been cut twice every year for hay—November and February, and grazed off during the Autumn. The photos are of last year's crop, first cut, and the standing crop is of the second cut prior to cutting last year. First cut yield would be 2½ tons to acre, and second cut would be about 30 cwt. I have sown Giant Colonial Cowgrass every year and have 24 acres either in mixed pasture or pure Clover. I find that **if Cowgrass is sown in mixed pasture** you have always green feed during Summer, when other grasses have dried off, and makes good Summer fodder as well as Spring. So far I have not had much experience in feeding off as it has mostly been cut for hay, but this year I have 12 acres in mixed pasture and is doing wonderfully well, 6 lbs. being sown with other pastures. Any visitor in the district who has seen this Giant Colonial Cowgrass has remarked at the good sole of Clover."

These recent reports will be of interest as they represent the opinions of practical men. Other experiences could be given but space will not permit and those included have been selected as being representative. **Brunning's Genuine Giant Colonial Cowgrass** is undoubtedly one of our most valuable permanent pasture and hay plants for many parts of Australia, and the acreage is increasing every year. This is the best proof of its value.

STRAWBERRY CLOVER

Brunning's "TARWEI" Strain.

"Tarwei" Strawberry Clover is a perennial plant with spreading stems, pink flowers, and foliage very similar to White Dutch Clover. The name has been derived from the seed heads, which very much resemble the fruiting Strawberry in appearance, but there is also a further similarity, inasmuch as the Clover throws out runners and roots as it goes along, thus establishing itself very quickly after the first season, during which the growth is slow.



Brunning's "Tarwei" Strawberry Clover, showing the seed heads, whence the plant derives its name.

CLIMATIC CONDITIONS:—"Tarwei" Strawberry Clover is particularly valuable for districts within 50 miles of the seacoast as it seems to revel in the salt air, but **its range is not limited to such places**, and where the right soil conditions are available it can be successfully grown inland as witness first class stands on the River Murray and at Corryong. The plant has given excellent results under irrigation in Northern Victoria, although under such conditions when the irrigation water is on in the Summer it is liable to burn and scald with the hot sun.

SOIL REQUIREMENTS:—The plant is fairly adaptable as regards climatic conditions, and will under reasonably suitable conditions give splendid results in districts ranging from temperate to cold, but it requires moist, heavy land to grow it to perfection. The home of "Tarwei" Strawberry Clover is on salty matured heavy ground, and generally the best returns will be secured near the seashore and up to 50 miles or so inland. On drained swamps of loamy and peaty character, on black river flats, and for land liable to crack in the Summer it has no equal. Excellent results will be obtained on any damp low-lying heavy land, and "Tarwei" Strawberry Clover will stand being covered with flood water for a considerable period without suffering injury.

Given a fairly rich soil containing sufficient lime, "Tarwei" Strawberry Clover will be wonderfully successful, and if the subsoil remains moist through the Summer it attains its greatest value. It is in a general way a late Spring and Summer grower, and one of its great points of value is that **it provides a considerable amount of highly nutritious and palatable feed in the Summer and Autumn when other pasture has dried off**, so that with a Strawberry Clover pasture it is safe to buy stock when many other farmers are compelled to sell. No other pasture can excel it for fattening or milk production.

"TARWEI" STRAWBERRY CLOVER. (Continued.)

UTILITY:—"Tarwei" Strawberry Clover is primarily a pasture plant and is principally used in this way, but, in addition, it makes Clover hay of first class quality, although when required for this purpose it is better grown in mixture with other Grasses and Clovers. Where soil and climatic conditions are congenial, "Tarwei" Strawberry Clover is without doubt **the best milk producing and the best fattening plant** that can be grown for grazing, and furnishes excellent pasture for sheep, cattle, horses and pigs alike. Sheep, however, must not be allowed to graze on it too long owing to their habit of biting the plants too close to the roots, which has a tendency to check the Clover, and if the sheep are allowed to eat it down continually without a spell the plants do not get a chance and are liable to be killed out. This emphasizes the **necessity for judicious grazing**, but it is likewise an excellent testimonial to its palatability.

SOIL PREPARATION:—Soil preparation is not essential, but where conditions permit, the preparation of a first-class seed bed such as is required for Lucerne will be well repaid. The condition of land suitable to "Tarwei" Strawberry Clover in many instances precludes the possibility of any initial preparation of the ground. If, however, the tussocks can be cut and burnt, the seed will get a good start sown in the ashes.

The need of lime in the ground is a question on which there appears to be a considerable diversity of opinion, but it seems certain that where this element has not been applied either prior to seeding or at some subsequent stage, the soil must already contain sufficient supply for the needs of the plants.



WHEN AND HOW TO SOW:—"Tarwei" Strawberry Clover may be sown at any time from the **middle of March** until **early July**, and in some moist districts even up to the first week in August. The earlier the seed is sown, the longer the growing period available before the Summer, and the longer the plant has to establish itself before being called on to withstand the first period of hot weather, the better. "Tarwei" Strawberry Clover will not yield much pasture during the first season, and appears to be slow in establishing itself in the initial stages, but after the first Summer, grows rapidly and luxuriantly, year after year, and can be grazed for nine out of the twelve months of the year where not flooded in the Winter.

When sown by itself, **2 lbs. of Brunning's "Tarwei" Shelled seed** broadcasted will be found sufficient to adequately sow an acre, and to ensure an even distribution the seed should be mixed with dry sand when sown alone.

When seeding, endeavour to sow right on the surface, as if planted too deeply, a considerable quantity of the seed will fail to germinate, this giving rise to the old bogey, long since exploded, that Strawberry Clover cannot be established from the seed.

SUBSEQUENT TREATMENT:—Apart from a rolling where possible after sowing the seed, no further treatment is necessary **except a top-dressing** of Superphosphate at the rate of 112 lbs. per acre every year about late July or August. This, together with judicious management of the paddock, will provide grazing for a very lengthy period of the year, and in districts with congenial conditions and not liable to floods, so that the stock can get on the land, "Tarwei" Strawberry Clover may be relied on for pasture for at least nine months of the year. The plants thrive from being kept eaten down, and one practical grower states that Strawberry Clover is thoroughly permanent if grazed well and carefully, but that it will dwindle and die out if left in an enclosure and not fed off.

Where the plant is growing on land subject to floods, the annual top-dressing is usually unnecessary as the silt brought down by the flood waters supplies the necessary elements.

IN MIXTURES:—"Tarwei" Strawberry Clover grows excellently in mixture with *Paspalum Dilatatum* and White Clover, and also in conjunction with Perennial Ryegrass and other better class Grasses and Clovers. If sowing with *Paspalum Dilatatum* use about **8 lbs. of Brunning's** best quality seed with **2 lbs. of "Tarwei" Shelled Strawberry Clover** per acre. For particulars of other standard mixtures with Ryegrasses, &c., see list of Permanent Pasture Mixtures on pages 43 and 44.

LOTUS MAJOR OR VILLOSUS

(Greater Birdsfoot Trefoil).

Lotus Major is the most valuable member of the Birdsfoot Trefoil family which includes many species. It is a deep-rooted leguminous perennial **thoroughly permanent** when once established, and very adaptable to different classes of soil. The plants send down strong tap roots, and these, on reaching the clay subsoil, send out laterals, which come up all round the parent plant. On the surface, Lotus Major forms runners, which, rooting at every joint, soon establish the plant and ensure its permanency. Owing to its habit of growth, it soon smothers other grasses and weeds, and is particularly valuable for killing tussocks and checking the growth of bracken fern.

Other members of the family most generally grown are the **Lotus Corniculatus** or Minor Birdsfoot Trefoil, **Lotus Angustissimus** and **Lotus Hispidus**, sometimes known as Boyd's Clover or Giblet Grass. The two latter species are only annuals.



Showing the persistency of Lotus Major among Bracken Fern, etc. It carries a fire well, and recovers rapidly after the burn.

UTILITY:—Lotus Major is of extremely high feeding value, and excellent for fattening cattle for market, as a milk producer for dairy cows, or as a pasture for sheep, horses or pigs. When cut and cured, it makes a hay of first class quality. It may also be regarded **as a land improver** owing to its habit of converting useless and abandoned forest country into first-class grazing areas.

Grazing is the most economical method of using Lotus Major and the one most generally followed. There is no danger of this plant ever becoming a pest and it does not appear to be troublesome in respect to bloat.

CLIMATIC REQUIREMENTS:—Lotus Major is best suited to districts with a moist climate, and, although generally regarded as a moist ground plant, also appears to grow well in certain fairly dry situations, and yields medium to good results on land varying from stiff clay to sandy loam. It roots and runs, and soon forms itself into dense sward, doing well on either hill land or marsh country, while it is particularly valuable in forest country, **where the rainfall averages over 30 inches per annum.** The **most suitable soil** is moist forest sand, such as is found in bracken country. On swampy land that only grows rushes and useless vegetation, Lotus Major will thrive, and growing rapidly, soon chokes out the rushes and sags, while it converts sour and abandoned forest country into excellent grazing land.

SOIL PREPARATION:—The conditions under which Lotus Major is grown usually preclude any elaborate soil preparation, although where possible, a well prepared seed bed will, as with all cultivated plants, do more towards ensuring a good stand, but **generally**, Lotus Major is **sown on a "clean burn,"** and does particularly well sown in the ashes after burning scrub, especially in damp places. It is easily established on any forest country that will carry a light fire, and once established, is permanent, the stand improving with age. The most suitable fertiliser is **Superphosphate**, used at the rate of from **84 to 112 lbs. per acre.**

LOTUS MAJOR OR VILLOSUS. (Continued.)

WHEN AND HOW TO SOW:—Seed of Lotus Major is generally broadcasted, and when sown by itself, should be mixed with dry silver sand, in order to ensure even distribution. The best sowing period is from the first Autumn rains in March or April up to the beginning of June, although, under suitable conditions, seed may also be sown in August and September. When seeded alone, the quantities vary, and up to **7 lbs. per acre** is sometimes used, but from **3 to 4 lbs. of Brunning's Supergrade** Quality seed will be found ample to establish a good stand, and as the plant soon spreads, any blank spaces are quickly covered.

It is advisable, wherever possible, to sow just prior to rain, as after showery weather the seed soon germinates, and the plants quickly make rapid growth. Where weather conditions are unfavourable, Lotus Major is slow in starting and on this account it is really better sown alone, as when seeded in mixtures the other Grasses and Clovers usually strike first, and are apt to smother out the Lotus Major while it is still in the younger stages of growth.



Plants coming up thickly in a rather damp situation, following a scrub burn. The associate grass shown in the illustration is *Paspalum Dilatatum*.

SUBSEQUENT TREATMENT:—The plant at first makes rather feeble growth, especially if weather and other conditions are unfavourable, but once established, is quite hardy, and thence onwards grows strongly, making rapid progress. It seems to grow stronger and taller in a paddock of bracken fern, apparently appreciating the protection thus afforded. **The plants keep green throughout the whole of the year**, and are thus valuable for adding the necessary succulency to the feed, when other Grasses and Clovers are dormant. The more closely cropped a thoroughly established paddock of Lotus Major is kept, the better, as close feeding encourages the plants to stool out and spread, while if it is desired to feed green, rather than to graze, the crop can be protected from the stock, when several cuttings will be obtained in a single season. When cut just after the blooming period, **Lotus Major makes hay of excellent quality.**

COMPARISON WITH STRAWBERRY CLOVER:—The points of similarity of these two excellent Clovers are that both will stand flood and revel in moist conditions; both are of creeping habit, and thoroughly permanent, and both yield fodder practically the whole year round. Both are extremely valuable for fattening sheep, cattle, horses and pigs, and each ranks very high as a milk producer.

The principal points of difference in their use are in the soil and class of country. **Brunning's "Tarwei" Strawberry Clover** is valuable for heavy river flats, black loamy soil, salty ground, and heavy land liable to bake and crack in the Summer. It is especially useful for binding wash-outs. "Tarwei" Strawberry Clover is also best adapted (but not exclusively) to conditions within, say, 50 miles of the sea-coast, and seems to thrive on the salty ocean breeze.

Lotus Major appears to be best suited to land containing a proportion of sand, and gives the best results on sandy marsh-land, heavily timbered country and sandy forest and bracken fern country. It is partial to the damp, sandy soil in creeks, gullies, and hilly forest clearings, and should be planted for preference on dirty, saggy country, and land that has not been cleared, even if it is heavy ground, and it is especially valuable on bracken fern country.

SUBTERRANEAN CLOVER

An excellent Permanent Pasture for Second Class Land.

Although botanically an annual plant, Subterranean Clover is **in reality a perennial**, because of its special habit of re-seeding itself, and when once established it is quite permanent. The lower shoots force their seed pods into the soil in readiness for future propagation, from which characteristic the Clover derives its name. It starts into growth with the first Autumn rains, and in about ten days there is a dense growth where the ground was previously bare. The plants grow very close together, the stems crossing and overlapping to a depth of several inches, the whole forming a dense mat. The crop dies down about the end of December or early in January, leaving a mass of stems and seed pods on the ground. In the green state, this plant is a

succulent nitrogenous fodder, extremely palatable to Sheep and Cattle, which keep it closely fed down, even when there is an abundance of natural pasture available. The lower stems, however, cling tenaciously to the ground, leaving the seed pods to penetrate the soil for the next season's crop, and thus prevent the plant from being eaten out. Sheep are also very partial to the residue after the plant has died down, and on good stands this is literally a mass of seed pods containing nutritious feed; providing water is available, they do remarkably well on this residue for several months, while no matter how hard the grazing, sufficient seed is left in the ground to produce the next stand.



A fine specimen of Subterranean Clover.

Subterranean Clover and Wimmera Ryegrass makes an excellent mixture for Winter and early Spring grazing and once established it is thoroughly permanent. Read carefully the article on pages 41 and 42 for fuller details.

Permanent Pastures are laid down to last and consequently only the very Best Quality Seed of the highest purity and growth should be used. Ensure good results by sowing only Brunning's "Incomparable" Farm Seeds.

SOIL REQUIREMENTS:—Its use is **not advised on first class dairy land.** The plant is able to adapt itself to an unusually wide range of soil conditions, but grows best on sterile, sandy loam, where the drainage is good and lime abundant. Provided, however, liberal dressings of Phosphoric Acid are given in readily available form (Superphosphate) it will transform even poor cementy soils deficient in lime and badly drained. It does well on most clay soils, on all sands and on drained peaty swamps. Subterranean Clover is **very susceptible to the amount of available Phosphoric Acid** in the soil, hence the manner in which it responds to Superphosphate. On very light soils, **annual top-dressing is an essential to maintain the pastures**, but on good soils the decline is less obvious and top-dressing every second year will generally prove sufficient. Superphosphate may be sown with the seed, and used again for top-dressing in the Spring, but after a very wet Winter, a mixture of Bonedust and Superphosphate would give more lasting results. The quantity of Superphosphate to be used at time of seeding varies from **84 to 112 lbs.** per acre, according to the quality of the land being sown down. It has been proved that the higher the rainfall, the less fertile the soil required, and in districts with a very low average rainfall, relatively good class land is necessary to grow Subterranean Clover successfully.

SUBTERRANEAN CLOVER. (Continued.)

UTILITY:—It is not only valuable as a late **Autumn, Winter and Spring** pasture for sheep, cattle, horses or pigs, but it possesses the extra advantage of **helping to suppress weeds**. It yields a meadow or clover **hay of excellent quality**, and cut when "just on the turn," makes the best of hay for dairy cows, yielding as much as two tons of cured hay per acre. The fattening qualities of the plant, especially when cut with the seed fairly ripe are remarkable. Its chief use, however, is for grazing.

It **does not taint milk** and can be recommended just as highly for dairying as for fattening. Subterranean Clover is **not dangerous** as regards **bloat**, although like all luscious fodders it has a tendency in this direction, but there is no more danger with this pasture than with Lucerne and certainly less than with the other Clovers. Under exceptional conditions, any rich pasture is liable to "blow" stock.



A luxuriant growth of Subterranean Clover. Right plot has been top dressed with 224 lbs. of Superphosphate; the left has had no manure.

CLIMATIC ADAPTABILITY:—Except in rare instances and on very good ground, Subterranean Clover does not succeed well where the average rainfall is less than 20 inches per annum, but the plant is **very adaptable to all temperatures**, although climates varying from temperate to medium cold will give the best results. The plant is successful both on natural rainfall and grown under irrigation, and does excellently either grown by itself or in mixture with other Grasses and Clovers. **See also the article on page 41.** Mt. Barker, in South Australia, is really the home of Subterranean Clover, but it is now also extensively grown in the South and South-Western parts of Western Australia, in most parts of N.S.W., throughout Tasmania and in practically every district in Victoria. It has not been grown to any extent in Queensland, but that State is now becoming interested in the possibilities of this excellent permanent pasture.

SOIL PREPARATION:—Very little soil preparation is necessary, a rough harrowing being all that is required. Indeed many pastoralists establish the plant by carrying a pocket full of seed, scratching the ground with a stick and stamping it in, leaving the first rains to do the rest. Lime although not essential, except on very acid soils, is valuable with all Clovers, but **must be applied** some weeks before using fertiliser or sowing the seed. A little initial outlay on Lime and Manure is more than amply repaid by the subsequent results.

METHOD OF SOWING:—The seed may be sown as early in the Autumn as weather conditions permit, and **when possible March and April** sowings are best as the plants have a longer period to establish themselves before forming seed in the late Spring. Good stands, however, have been secured by sowing as late as July and early August, but the plant, being an annual, a **good deposit of strong vigorous seed is essential the first season** to establish the pasture permanently. There is seldom any difficulty in this respect, especially if the Clover is given a **top-dressing of Superphosphate about the middle of September or early in October the first year after sowing the seed.** When sown alone, as small a quantity as **2 lbs. of seed will sow an acre**, but as the first cost is the only one, a more liberal seeding in the first place will ensure a bigger yield, while enabling the Clover to establish itself more thickly the second season. Once it is going properly, there is no necessity for resowing, and on this account the seed should not be stinted. **5, 6, or even 7 lbs. of seed is not too much for an acre** where a quick stand is desired. Fertiliser may be put in the ground first, or mixed with the seed, so that both are distributed in the one operation. This mixture can be sown through the manure run of the drill, allowing the hoes to just scratch the surface of the soil. This can be effected by disconnecting the conveyor tubes and allowing the seed to broadcast itself. Should the soil be at all loose or tending to dry out, **roll after sowing**, otherwise a brush harrow will cover the seed satisfactorily.

When mixing Subterranean Clover or any other seed with Superphosphate, remember it **must be sown immediately and not allowed to stand mixed for, say, more than an hour**; after this time, the mixture is liable to burn the seed and thus **injure its germination**, but **providing sowing is proceeded with promptly after mixing, no danger need be feared** from this source.

SUBTERRANEAN CLOVER. (Continued.)

SUBSEQUENT TREATMENT:—To get a field established quickly, it is necessary to sow thickly, although where light seedings are used, the runner development may be relied on to thicken the pasture in due time. **The secret of success is to shut up the freshly sown paddock the first Spring**, as if grazed during this period the runners are liable to be pulled up by the stock, and the strength of the remaining plants materially checked, while by resting the Clover from the middle of September onwards, it is afforded every opportunity to make a good seeding, the benefit of which will be observed in future seasons. When the Clover is sown in a mixture with Oats or with Grasses and other Clovers for hay, the latter must be allowed to get fairly ripe before cutting, so as to give the Subterranean a reasonable opportunity of seeding, and **when cutting** it is necessary to **leave a longer stubble** than usual. In subsequent seasons, these precautions are quite unnecessary. No cultivation is needed at any time.



Plants of Subterranean Clover in mid-July. The Field from which these Plants were taken was quite bare in March.

TOP-DRESSING:—Subterranean Clover responds very readily to available Phosphoric Acid in the ground, but will do fairly well under the most unfavorable conditions even without fertiliser. A **top-dressing** of from **84 to 112 lbs. of Superphosphate per acre**, either broadcasted or drilled in the Spring, makes a wonderful difference, and the extra returns well repay any time and labor spent in this direction. On light soils, the vigor of the Clover declines rapidly until ultimately the plants become stunted and of little value, although upon being top-dressed it responds rapidly and is soon completely restored, hence the necessity for annual treatment. On this class of soil, **from 168 to 224 lbs. of Superphosphate** might with advantage be used after seeding, following with an application of 112 lbs. of Superphosphate every Spring.

On better class land, the decline is not so rapid, and the response to fertiliser is even more wonderful. **Top-dressing** under these circumstances is **also desirable, using 112 lbs. of Superphosphate** per acre, while that amount might profitably be doubled every second year. In some districts, top-dressing may be done in the Autumn, when the Clover is about to start into growth, but **application in the Spring will generally be found more satisfactory**, especially in very cold wet districts.

GENERAL:—Subterranean Clover is particularly well adapted to growing in mixtures both with and without irrigation.

In Gippsland and under similar conditions, it is a **good plan to top-dress Paspalum** with Superphosphate, adding a light seeding of Subterranean Clover. These two plants make an excellent combination, and furnish good feed practically the whole year, the Clover being dormant in the Summer, and when it dies off, the Paspalum is at its best. **See pages 43, 44 for list of Brunning's Standard Mixtures.**

Subterranean Clover will largely suppress Sorrel and it will also choke out Cape Weed, Silver Grass and Onion Grass. It will not kill Bracken, but if the Fern is cut and burnt, and Subterranean Clover sown at the rate of from 4 to 6 lbs. per acre, liberally mixed with Superphosphate, it will materially help in crowding out the Fern, because more stock can be carried amongst the Fern, and when grazing they nibble off the young shoots concealed by the Clover, and bruise and tramp the tender Fern fronds. Subterranean Clover has also been known to counteract the poisonous effects of Lobelia Weed on the Western Plains of Victoria.

SUDAN GRASS

A Wonderful Drought-Resistant Summer Fodder and Hay Grass.

Sudan Grass is a highly drought resistant, Summer-growing annual *Sorghum* which matures very quickly, the first crop being **ready to cut in from eight to ten weeks** after seeding, the time varying according to weather conditions. In a normal season it yields three cuttings, while in a very favorable year a **fourth cutting** may be taken or the last growth saved for seed. Sudan Grass stools freely and one plant will have as many as one hundred stems.

It is an annual with a short fibrous root and is killed out by frosts, although it can be **easily eradicated** at any time so that it is never likely to become a pest. In this respect it differs from the perennial Johnson Grass which is difficult to get rid of on account of its underground root stocks or rhizomes.

UTILITY:—The crop may be **pastured after the seed head has shot**, cut for green feed, or cut and cured into Hay, which is of excellent quality. It also makes first class ensilage, and the last cutting may be allowed to stand for seed, which will generally be found to be a payable proposition.



A Nice Crop of "Garawi" Sudan Grass.

CLIMATIC REQUIREMENTS:—Sudan Grass is best adapted to hot, dry districts with a fairly long Summer season, but can be grown in parts of Gippsland and in the Western District of Victoria. In and around Sale and Maffra in Gippsland, some excellent yields of Sudan Grass have been obtained. It is however, more suited to the Northern areas of Victoria, and is **one of the leading** Summer Fodders in N.S.W. and Queensland. Sudan Grass is also extensively grown in both South Australia and Western Australia.

LIABILITY TO BLOAT:—There is no danger of "blowing" providing **reasonable care** is taken, but like any other green fodder, Sudan may cause bloat. This may be prevented by giving the beasts some Lucerne Hay to partially appease their hunger before turning in on the Sudan, and by penning on small areas at a time. It is **always inadvisable** to turn stock in a ravenously hungry condition, especially milking cows, in on Sudan Grass, or for that matter any green fodder. See also **Brunning's** "Fodder Crops for Australia," price 2/10 post free.

SOIL REQUIREMENTS:—While the best results are obtained on rich loam, Sudan Grass has been grown successfully on almost any class of soil from heavy clay to light sand, although in very sandy ground the yield is liable to be light.

A **rather firm seed bed** gives the best results, but thorough and adequate drainage is essential. The ground can be prepared the same way as for Maize. When the seed is to be drilled, plough in the early Spring and harrow down well to fine the ground as much as possible. **Spring ploughing is preferable** for the seed bed as it assists in warming the ground, and this is essential as the germination of Sudan Grass seed is delayed by a cool soil.

On reasonably good land fertiliser may be unnecessary, but on medium or very poor quality soil use a manure such as **Superphosphate** at the rate of 112 lbs. per acre. Superphosphate has been proved to be the best general fertiliser for Sudan Grass.

SUDAN GRASS. (Continued.)

TIME AND METHOD OF SOWING:—In Victoria seed may be sown from about the middle of September up to early December, but in the Northern States sowings may be continued until February. The earlier seeding can be completed, the better the yields, owing to the longer growing period available. Do not however, sow while the soil is cold as the seed is then liable to hang in the ground for a considerable time and may rot, or, at the best, a poor stand or slow, stunted growth will be the result. In very dry districts, sow at the rate of **three or four lbs.** to the acre in **drills**, or about **15 lbs.** per acre **broadcast**, but where ample moisture is available either from abundant Summer rainfall, or by means of irrigation, from **eight to ten lbs. in drills**, or from **twenty to twenty-five lbs. broadcast** is not too heavy a seeding per acre.

When sowing for hay, **broadcast thickly** as thick seeding produces the best quality Hay owing to the very much finer stems. Where grown in cultivated rows Sudan is apt to be a little coarse, and not so desirable for market hay, but for home feeding this will be of little disadvantage as the stems do not become sufficiently woody to be unpalatable to stock.



A Second Cutting of "Garawi" Sudan Grass, taken 4 weeks after the first. In this time, the Second Growth reached 5 feet, with only one watering.

Ensilage is an insurance against crop failure, a stand-by in times when feed is short and an excellent method of utilising surplus crops. In addition, it is superior for fattening and more akin to natural food than hay. Read the article on page 32 carefully. Ensilage will enable you to use profitably your surplus of Sudan Grass, Imphee, Lucerne and other crops. By this means there is no waste.

THE BEST SEED:—The best quality Sudan Grass seed is **Brunning's true "Garawi" strain**, which is of the highest purity and germination and free from Johnson Grass or cross fertilisation with the other Sorghums. Sorghums cross-hybridise very freely, and to preserve the true "Garawi" strain and keep it pure, **Brunning's "Garawi" seed** is saved from paddocks well isolated from Johnson Grass or the other Sorghums. Place your order early so as to have the seed on hand when you are ready to sow. You will realise that **"quality"** is of the **first importance**. Secure your requirements either direct from **Brunnings** or through their accredited selling Agents, and be certain of getting the genuine article.

SUBSEQUENT TREATMENT:—When planted in rows, frequent cultivation is necessary to conserve the soil moisture. In dry districts with a light rainfall, where irrigation facilities are not available, **lack of moisture** can to a great extent **be compensated for** by sowing in rows and cultivating regularly. When cutting for seed, allow the first heads to ripen fully, as the stools will ripen somewhat later than the main stem, and there is seldom any great loss from shattering.

Although **Brunning's Sudan Grass** as compared with other Sorghums, is comparatively harmless if grazed in its early stages of growth, and while many successful growers pasture stock on the plant at all stages without any loss or trouble, it is **advisable to take every precaution**, especially if the crop has been stunted by frosts or a period of drought. Under such conditions it may be cut and fed green **without any danger**. Where the crop is growing steadily, it is better to try a beast or two of inferior value before letting the herd follow, but **after the flowering stage** it is **quite safe** to pasture, the poisonous element (if any) having quite disappeared by this time.

THE CONSERVATION OF SOIL MOISTURE

The Necessity of Humus in the Ground and the Importance of Cultivation.

The whole secret of the conservation of moisture in the soil may be clearly represented by taking a cube of ordinary loaf sugar and placing on top of it a heap of powdered sugar about a quarter of an inch deep. The solid sugar represents the soil and the powdered sugar the "soil mulch," which is obtained by harrowing, disking, or cultivating the ground.

Take a glass with a concave bottom, and dilute in water a few drops of writing ink, and place the cube of sugar in the fluid. You will notice how quickly the dark solution rises, and in a few seconds it has reached the top of the solid sugar, but there it stops. The "powdered sugar mulch" does not take up the liquid in the same way as the solid lump of sugar, and if you let the experiment stand, you will find it would take an hour or more for the dark liquid to soak through the powdered sugar. This simple test clearly demonstrates the whole secret of the conservation of soil moisture. By disking and harrowing, or to be brief, "cultivating" the soil to form a fine mulch, this powdered soil or surface mulch will act just like the powdered sugar.



A Crop of Brunning's White Tartarian Oats.

Write Brunning's "Service"
Dept. for Information and
Advice. No charge is made
for suggestions. Address
your letter to Box 857K,
Melbourne.

Soil ordinarily contains many passage-ways through which water quickly rises to the surface by what is termed "Capillary attraction," and this power of drawing up water from the lower strata towards the surface is one of the greatest importance from the Agriculturist's point of view. It is possessed, in a greater or lesser degree by all soils being greater in proportion as the pores are finer. Sand possesses this power to the least extent, and clay to the greatest, thus a clayey soil is always wetter than sandy ground placed under the same influences.

Regular Cultivation not only conserves the Soil Moisture, but keeps the ground well aerated and in a sweet, healthy condition. Practice regular cultivation in conjunction with efficient Top-dressing and maintain your soil in a high state of fertility.

When the surface soil is left undisturbed, unless the mulch covering is provided by disking, harrowing or cultivating the ground to prevent the water rising quickly to the surface, the moisture will evaporate and the soil will bake, break and become hard, dry and unproductive. The importance of conserving moisture will be realised when it is understood that experiments have determined that it requires approximately 300 tons of water to grow an average acre of corn, and this total does not take into account the water that is being constantly evaporated from the soil in which the crop is growing. The 300 tons represents only the moisture actually used by the plants themselves.

The water holding capacity of any soil depends on its composition and texture; the lighter a soil, or the more sand it contains, the lesser water it will hold. The more humus a soil contains, the greater its water holding capacity, for humus is a vegetable sponge. The "Conservation of Soil Moisture" therefore depends on two factors, each of which are equally important.

1. Thorough cultivation to preserve the "surface mulch."
2. A good supply of humus in the ground.

Humus is necessary to take up the moisture and keep it from seeping into the lower levels beyond the reach of the plants and from running off the surface.

THE CLIMATIC CONDITIONS OF SO MANY PARTS OF AUSTRALIA DEMAND THE MOST THOROUGH AND CAREFUL CONSERVATION OF SOIL MOISTURE that the Agriculturist who learns to store moisture in his soil and to keep it there for the use of crops when they most need it, has solved one of the most important problems of crop production.

IMPHEE OR PLANTER'S FRIEND

A Late Maturing Sorghum for Winter Feed.

Imphee or Planter's Friend is valuable for late districts and is much harder to cold than Ambergane, *Sorghum Saccharatum* and the other Sweet Sorghums. This species is well suited to Gippsland and other localities with a similar climate, especially when it can be sown near the sea coast. The seed of Imphee is of a brownish color, the outer cover not being retained as with Ambergane. A special feature of Imphee apart from its late maturing quality is its habit of ratooning or stooling out, which takes place after each cutting, thus giving a number of good cuttings in a single season.

Imphee is an annual and might best be described as a late Summer, Autumn, and in some districts, a Winter Fodder. It may be **pastured, cut and fed green, and utilised for ensilage**, while the last growth may be saved for a seed crop. Imphee is unsuitable for hay and is not recommended for this purpose. As it has no value for ploughing under for green manure, it is advisable where possible to burn off the stubble and to plough the ashes in.

As a pasture plant it is valuable for fattening sheep and cattle for market, for dairy cows (its milk producing qualities are undoubted) as well as for horses and pigs, and Imphee is very popular in the coastal districts of N.S.W. as well as in Gippsland, where it does particularly well.

Apart from the heavy yield, another advantage of Imphee is its drought resistant quality combined with the fact that the crop can be used over a fairly long period.

CLIMATIC ADAPTABILITY:—In addition to its suitability for dry, hot districts, and it has been grown most successfully in Northern Victoria and other drought areas without irrigation, it gives excellent results when grown in cooler localities near the sea-coast, as witness the many acres sown each year in the coastal districts of N.S.W. Imphee is also valuable for planting in Gippsland.

SOIL REQUIREMENTS:—While the best results are obtained on rich loam, Imphee or Planter's Friend can be grown successfully on almost any class of soil from heavy clay to light sand, although in very sandy ground the yield is liable to be light.

A rather firm seed bed gives the best results but thorough and adequate drainage is essential otherwise the ground is prepared in the same way as for Sudan Grass. When the seed is to be drilled, plough in the early Spring and harrow down well to fine the soil as much as possible. Spring ploughing is preferable for the seed bed as it assists in warming the ground, and this is essential as the germination of Imphee seed is delayed by a cool soil.

On reasonably good land fertiliser may be unnecessary, but on medium or very poor quality soil use a manure such as Superphosphate at the rate of 112 lbs. per acre. Superphosphate has been proved to be the best general fertiliser for Imphee.

WHEN AND HOW TO SOW:—In most parts of Victoria, seed may be sown from about the **middle of October** up to the **first week in January**. In New South Wales and Queensland sowings may be continued as late as the first week in February. The earlier the seeding can be completed, the greater the yield, owing to the longer growing period available. Do not, however, sow while the soil is cold as the seed is liable to hang in the ground and rot, or, at the very best, a poor stunted growth will be the result.

In very dry districts, sow at the rate of **4 to 5 lbs.** to the acre in drills or about **15 lbs.** per acre **broadcast**, but where ample moisture is available from a good Summer rainfall, from **8 to 10 lbs.** in drills, or from **20 to 25 lbs.** **broadcast** is not too heavy a seeding per acre.

SUBSEQUENT TREATMENT:—When planted in rows, especially in dry districts, frequent cultivation is necessary to conserve the soil moisture, and under such conditions shortage of moisture can to a great extent be compensated for by this regular cultivation.

Imphee may be **cut and fed green at any time provided** the fodder is allowed to lie and wilt in the sun for two or three hours, but owing to the danger of Sorghum poisoning it **should not be grazed until** the plants are in flower and the seed head has formed.

In the early stages Imphee is of slow growth, but once established several cuttings will be obtained in a season, and in districts with a mild Winter the plants will stand right through until the early Spring. Very heavy yields are obtained and where climatic conditions are suitable Imphee can be confidently recommended—especially to the Dairy Farmer.

IMPHEE AND SACCALINE:—The question is often asked, what is the difference between Imphee and Sorghum Saccaline? This Sorghum Saccaline is said to be an improved form of Imphee, but as far as we can determine **the two plants are very similar** and the points of difference are too slight to justify any extensive reference.

Some people say that Saccaline retains its sugar content better than Imphee; other authorities prefer Saccaline for late Autumn and early Winter feed, using Imphee for providing Green Fodder earlier in the season. Imphee taken over the full period of its growth is said to give a greater yield. Several Authorities are of the opinion that while there is very little difference, Sorghum Saccaline is easier to handle owing to its method of growth and quickness in reaching maturity.

From our own observations, we are of the opinion that the two plants as grown today are so similar in most respects that while **we have each grown separately**, there is nothing to choose between them and **Brunning's** reliable machine-dressed seed of either Imphee or Sorghum Saccaline can be sown with every confidence.

JAPANESE MILLET

JAPANESE MILLET is a drought-resistant annual sometimes known as Barnyard or Billion Dollar Grass, and provides fodder during the late Spring, Summer and Autumn. The botanical name is *Echinochloa Frumentacea*. It is one of the leading annual Summer fodders for most Australian conditions and is suitable for almost every part of Australia, and can be successfully grown as far south as Hobart, in Tasmania. While Sudan Grass may be preferred by many for the Northern districts of Victoria, which have fairly long warm Summers, Japanese Millet is also a payable crop under these conditions, especially in the Kerang and Macorna districts, but its greater value is as a Summer fodder in the cooler parts of this State in localities with shorter periods of warm weather, such as Gippsland, and although it will not withstand frost, it is reasonably hardy to a certain amount of cool weather.

UTILITY:—Japanese Millet can be **pastured**, cut and **fed green**, made into hay or utilised for ensilage, and in addition, the last growth may be allowed to run to seed. It is **principally used for pasturing**, and is most valuable for providing feed during the dry Summers. When grown for hay, it is **not advisable to feed** Japanese Millet to horses by itself, but mixed with oaten hay it is rendered non-injurious and makes a fine mixture of high feeding value.



A Drought Insurance: A Crop from Brunning's "Standard" Quality Japanese Millet Seed.

It is **less dangerous** in connection with "bloat" than most fodders, and is quite safe, providing the usual precautions are observed. **When being cut for green feed** it is advisable to allow Japanese Millet to lie and wilt for two or three hours before giving to stock, especially dairy cows.

Being an annual it is very **easily eradicated** by preventing seeding and can **never become a pest**, but in any case there is no difficulty in getting rid of Japanese Millet at any time when desired.

SOIL REQUIREMENTS:—The ground must be **well worked** and a **fine firm seed bed prepared**, otherwise Japanese Millet is **very adaptable**, and does well on most classes of soil excepting very heavy ground and low-lying land inclined to excessive moisture. The most suitable fertiliser is **Superphosphate** at the rate of **112 lbs.** to the acre.

WHEN AND HOW TO SOW:—The **secret of success** in growing Millet is **shallow seeding and sowing only** when the ground is **warm**. With shallow surface soils, deep sowing is not advisable, and where the ground is loose and open, **rolling** before seeding is very **essential**.

The seed may be sown according to the conditions of the particular season from the **middle of September to early in January**, either in drills or broadcasted. Sowing in drills **7 inches** apart, from **8 to 10 lbs.** or broadcasted from **15 to 20 lbs.** of Brunning's "Standard" Quality M/Dressed and Graded seed is required per acre. These figures **apply only to Brunning's best quality**, and larger quantities per acre must be allowed for where Farmers Dressed and lower grade seed is being used. When **grown to be cut for green feed**, hay or ensilage, sown in rows **15 inches** apart use from **6 to 7 lbs.** of Brunning's "Standard" Quality seed per acre.

Take care not to sow too early, nor too deep, from **1 to 1½ inches** being quite sufficient depth. Seed put down too deep, or sown too early in cold ground will only go mouldy, the result being, if any, a very poor germination.

JAPANESE MILLET. (Continued.)

SUBSEQUENT TREATMENT:—Seeded at the right time Japanese Millet grows very quickly and can be eaten off in from five to six weeks after sowing. **When only intended for grazing**, pasture when the plants are about 6 inches high, feeding down fairly close, as this tends to make them stool out and become much thicker. After being pastured, take the stock off the paddock, and where irrigation is available, apply the water.

Then, if convenient, harrow the paddock with a set of sharp harrows across the drills, and allow the crop to again grow to a height of 8 to 10 inches, at which stage it can be further pastured. With this treatment, Japanese Millet can be kept growing throughout the Summer, and will carry from 10 to 15 sheep per acre. Harrowing is necessary at least three times during the season, and the increased growth of the crop will show the benefit of this operation.

Do not keep stock too long on any one paddock, as this means less actual growth, as well as the trampling down of the Millet, whereas by sub-dividing up into three or four paddocks, the intervals of rest soon restore any damage done in this way.

When grown in 15 inch drills to be cut for green feed, hay or ensilage, work the scuffer between the rows until the Millet is about 3 feet high. **Cut the plants well before the seeding stage**, and down to **not less than 3 or 4 inches** from the ground; This is particularly important, as closer cutting is liable to kill some of the plants. **Before feeding to stock**, especially dairy cows, be careful to **allow the Millet** to lie and wilt for two or three hours.

If desired after the second cutting, the crop may be left to seed, but if intended for hay, do not allow it to go too far, otherwise the plants will become woody and fibrous, and consequently indigestible; **the best time for cutting Japanese Millet for hay** is just before the flowering stage.

Cut the crop with a binder, making into small sheaves loosely tied, so as to allow of drying without becoming mildewed. Stook in rows, not too thickly, after which it can be stacked similarly to Oats or Wheat.

GOOD MILLET SEED:—The old adage, "**The Best Seed is Always the Cheapest**" applies fully to Japanese Millet, so buy your seed from **Brunnings**, who are the leading distributors, and use their "Standard" Quality, Machine-dressed, Graded and Tested Seed, which is the best available. The **special features of this high grade line** are the plumpness of seed, thus ensuring good strong vigorous growing plants, the freedom from husk, weed seeds and other foreign matter, together with the high percentage of germination. **Use the best seed**, as it is not only cheaper in the cost of seed per acre, but goes a long way towards ensuring a payable and satisfactory crop.

HUMUS ESSENTIAL TO GOOD SOIL.

1. ENLIVENS THE SOIL.
2. MAKES A HOME FOR BACTERIA.
3. ADMITS AIR AND WATER INTO THE SOIL.
4. RETAINS THE MOISTURE.
5. KEEPS IT LOOSE AND WARM.
6. MAKES IT MORE PRODUCTIVE.
7. PREVENTS WASHING AND BAKING.

SOME NOTES ON ENSILAGE

Ensilage is firstly a means of utilising surplus crops not required at the time and secondly a **high class form of fodder**, in addition to its economic value as a stand-by when other feed is scarce. It is said that no sheep and cattle will fatten as well on hay, nor will the flesh be as lean and juicy as when fed on ensilage, as the latter is the **nearer to natural food** and certainly easier and more economical to make than hay.

A simple way of making this ensilage is to excavate a pit of any length required, but only three or four feet deep, with just sufficient width at the bottom to permit of a cart and horse passing through. Do not make the sides vertical but allow them to slope outwards towards the top to allow the material when sinking to wedge itself against the sides. The approach to this pit should be graded to enable a horse and cart to go right through, and the constant traffic soon presses the material into a solid mass, which can then be covered with earth thrown from the sides.

As each load is filled in, scatter about 14 lbs. of salt over it, as **in addition to improving** the smell, color and taste of the silage, salt is an antiseptic which regulates the heat of the pit by controlling heat-generating bacteria.

By the above method, there is no need of any buildings or machinery, all that is required being a little shallow excavation, which makes the filling and emptying a light task.

If **Lucerne** is preserved in this way, **the full value of the leaves is retained**, whereas much of it is lost when Lucerne is converted into hay. While there is no doubt, that hay is required on any mixed farm, especially as a binding feed for horses and cattle when grass is wet, it will be found that the **most economical method of keeping the main bulk of fodder** is in the shape of ensilage.

PERMANENT PASTURES OF GRASSES AND CLOVERS

Part 1.—Their Value and Utility.

The expression "Permanent Pasture" in its broadest sense includes all fodder plants yielding herbage which are truly perennial, or which, like Wimmera Ryegrass and Subterranean Clover, reproduce themselves from seed each year. With the increasing use of selected mixtures of Grasses and Clovers, the term is now more generally used in connection with such mixtures, other truly permanent pasture plants such as Prairie Grass, Lucerne, Giant Colonial Cowgrass, etc., when sown alone, being referred to by their own name.

These remarks deal with "Permanent Pastures" in the sense of mixtures of Grasses and Clovers carefully and scientifically selected to suit the soil (and in the absence of irrigation facilities), the annual rainfall of the district wherein they are to be grown.



Especially where the holding is of comparatively high priced land of limited acreage **must every square yard of available land be utilised**, if the property is to be carried on profitably, and it is here that owing to their many points of utility that "Permanent Pastures" play such an important part. The special features of these Grass and Clover mixtures may be briefly summarized as follows:—

1. They can be so selected as to provide "All-the-Year-Round" Pasture.
2. The stock-carrying capacity of the land is increased.
3. Being grazed, labour involved in cutting is eliminated, thereby reducing expense.
4. Cultivation being unnecessary, they are economical in upkeep.
5. The best and deepest soil is not necessary, as with Lucerne.
6. Hoven or Bloat need not be feared.
7. As natural manure, the produce absorbed by the stock is put back on the land.
8. The grasses and clovers provide a more balanced ration than Lucerne alone.
9. They are the best and most natural feed for milch cows.
10. The milk yield is free from taint, besides being rich in butter fat.
11. Properly treated and at very little expense, the pastures are thoroughly permanent.
12. A grass and clover pasture in good condition appreciably increases the capital value of the holding.

Taking these points in order, the use of a mixture **affords the advantage** of including Grasses and Clovers maturing at various periods, so that with careful discrimination in making up the mixture the pasture may be made available during the whole twelve months of the year.

GRASS AND CLOVER PASTURES. (Continued.)

CARRYING CAPACITY:—On a property comprising tens of thousands of acres, where the actual stock-carrying capacity is not a very vital matter, the natural grasses may be relied on, but **with a limited area**, where it is necessary to carry several beasts to the acre to make the property a profitable transaction, a permanent pasture mixture not only increases the carrying capacity, but also the value of the holding, and while the pasture may if desired be occasionally cut for hay it is generally utilised for grazing, and thus the labour involved in cutting is eliminated and the expense considerably reduced; or, in other words, in a properly laid down permanent pasture the stock can be made to do the work.

ECONOMICAL UPKEEP:—Then again, once the pasture is laid down **cultivation is unnecessary**, so that the **upkeep is economical**, and as the highest quality and deepest soil is not essential for Grasses and Clovers, there are no limits to the area that may be sown down.

LUCERNE:—When climatic conditions permit or where irrigation is available, first-class, deep soil suitable for Lucerne should be sown down with the "King of Fodders," and it is not at any time suggested that Grasses and Clovers should supersede Lucerne on true Lucerne country.

BLOAT:—With the ingredients scientifically and properly balanced, so that the right proportion between the Grasses and Clovers is preserved, there need be no fear of hoven or bloat, and furthermore, the produce absorbed by the stock is returned to the land in the shape of manure. Finally, a mixture of Grasses and Clovers **provides a properly-balanced ration**, and in this respect is superior to Lucerne. There is no danger of the milk yield being tainted, and properly treated, and with the small expense of a regular top-dressing, these pastures are thoroughly permanent.



An old pasture where the permanent grasses are beautifully associated with New Zealand Wild White Clover.

SELECTING THE MIXTURE:—The varieties to be included in any particular mixture and the quantities of each vary according to the conditions under which the pasture is to be grown, and while all those recommended are good grasses for their particular conditions, **some being more suitable for first-class country**, others for second-class land, it must be borne in mind that **Paspalum Dilatatum should on no account be included** in mixtures to be sown on land which is to be irrigated, owing to the danger of spreading. Paspalum seed is liable to be carried on the irrigation waters, and **this plant can very easily become a pest** should it make its appearance in first-class country amongst other established Grasses and Clovers, or even Lucerne. Under such conditions its presence is neither desirable or advisable, and its elimination may become a matter of considerable expense and extreme difficulty.

VARIETIES:—The Grasses and Clovers most generally utilised may be summed up as follows:—Perennial Ryegrass, Italian Ryegrass, Westernwolds Ryegrass, Cocksfoot, Timothy, Crested Dogtail, Creeping Bent, Paspalum Dilatatum, Kentucky Blue Grass, Cheving's Fescue, Wallaby Grass (D. Pilosa), Meadow Foxtail, White Dutch Clover, Wild White Clover, Cowgrass Clover, Alsike Clover, "Tarwei" Strawberry Clover, Subterranean Clover, Sheep's Trefoil, Clustered Clover, Gin Gin or Drooping Flowered Clover, and Sweet or Bokhara Clover.

GRASS AND CLOVER PASTURES. (Continued.)

PRAIRIE GRASS:—Prairie Grass, although an excellent pasture, is excluded from the above list, as owing to its extreme palatability it is unsuitable for including in mixture with other Grasses and Clovers, and stock, especially horses, are liable to eat the Prairie Grass right out, neglecting the other ingredients in the mixture. (See article on page 40.)

ESSENTIALS TO SUCCESS:—The many material advantages to be derived from any Permanent Pasture will depend on its proper establishment in the first place, together with careful common-sense methods of management after the Pasture has been laid down and has reached the state of productivity. The methods of laying down and maintaining a Permanent Pasture to secure the maximum results will be dealt with later, but a few words on the most common causes of disappointment, and one might even add failure, will not be out of place here. These may be briefly summed up as follows:—

- (a) Sowing unsuitable varieties or strains.
- (b) Neglect to provide adequate drainage to remove excess moisture.
- (c) Using a mixture of Grasses and Clovers unsuited to the particular conditions.
- (d) Sowing on land that is "dirty" or weed-infested.
- (e) Using ground "worn out" by continuous cropping without proper preparation and adequate manuring.



Steep hill country in the North Island of New Zealand successfully grassed with *Danthonia Pilosa*.

Top-dressing promotes vigorous growth and thus helps to choke out weeds.

CLEAN GROUND:—The importance of clean ground cannot be overstated when laying down land to Permanent Pasture, and it must be remembered that the competition from weeds may be serious enough for the first year or two on land which seems to be reasonably clean, but where thorough cleaning prior to sowing down has been neglected or was practically impossible owing to conditions not permitting, there is a real danger of the weeds gaining the upper hand before the cultivated Grasses and Clovers are able to establish themselves.

WEEDS:—To emphasise the importance of first getting rid of the weeds, it is only necessary to review the bad points of these unwelcome strangers. The following brief summary will suffice:—

1. Weeds occupy space which should be filled by useful plants.
2. In addition to screening off light and air, they deprive the crop of various manurial constituents.
3. Being harvested with crops, they depreciate the value of same.
4. Some weeds, such as Dodder and Mistletoe, are parasitic, and do not derive their sustenance from the soil and air. They thus materially weaken the crop.
5. They are a harbour for insects and other pests. The danger is due to neglecting to apply insecticides or fungicides to weeds, which thus form a nursery for pests.

GRASS AND CLOVER PASTURES. (Continued.)

THE BEST STRAINS:—It is here that one may remark on the necessity of sowing only highly-persistent and the most productive strains of plants. Different species of Cocksfoot and Perennial Ryegrass, for example, vary very considerably in their production of leaf to stem, and as the leaf is the richest and most nutritious portion of the plant, the value of leafy strains which are, especially with Cocksfoot and Perennial Ryegrass, the most persistent (or permanent), will be fully realised and their importance for pasturing purposes thoroughly appreciated. In Cocksfoot, allowing for very slight variations, there are over one hundred species, but that great authority on this plant, Professor Stapledon, has grouped all these Cocksfoots into four distinct classes:—

1. With more leafage than stem.
2. Inferior to No. 1, but of the same type, the leafage still predominating.
3. A slightly greater percentage of stem than leafage.
4. Stem very much greater than leaf.



A general view of the hills of Akaroa, New Zealand, where the celebrated Akaroa Strain of Cocksfoot is grown.

Pastures of the highest class cannot be produced in a single season, but the cumulative effect of repeated applications of fertiliser (i.e. regular top-dressing each season), is a very potent factor in raising their standard from year to year. Although some improvement is apparent after the first application, the maximum returns cannot be expected in the first season.

The first type, which it will be readily understood is the most suitable for grazing, is represented here by the Genuine Akaroa grown New Zealand Cocksfoot. This type comes from a very limited area, and is quite distinct from seed saved in other parts of New Zealand, and generally known as "Plains" Cocksfoot. This Plains Cocksfoot is exemplified by No. 2. Types Nos. 3 and 4, more suitable for hay than pasture, are typical of various strains of Danish Cocksfoot.

The Perennial Ryegrasses may be similarly classed, and taking into consideration their persistency or perennial habit may be placed in the following order of superiority:—

1. Hawkes Bay or Poverty Bay.
2. Canterbury or Southland New Zealand grown.
3. Irish Ryegrass seed.

IMPORTANCE OF STRAIN:—The same remarks might be applied to certain other Grasses and Clovers. The point to be emphasised is that "STRAIN," a factor so long overlooked by the majority of farmers, must be taken into greater consideration in future if the property is to be carried out with financial success. Price, rather than quality and strain, is too often taken into consideration when buying seeds, to the disadvantage later on of the purchaser.

Part 2.—How to Lay Down and Maintain.

ESSENTIAL OPERATIONS:—The operations necessary for the successful establishment of Grass and Clover Pastures, with or without irrigation facilities, as well as the subsequent treatment essential to the maintenance of the highest productivity, may be briefly summarized as follows:—

1. **Liming the ground where necessary.**
2. **Proper soil preparation to provide a fine, firm, level, shallow seed bed.**
3. **The use of fertiliser, natural manure for preference.**
4. **Sowing as early as possible after the first Autumn rains.**
5. **Care to avoid sowing too deeply.**
6. **A light rolling after sowing to compact the seed and soil.**
7. **Using a mixture suitable to the soil and climatic conditions.**
8. **Sowing thickly only the very best quality seeds, both as regards strain, growth, and purity.**
9. **Prevention of surface caking of the soil, and checking of excessive evaporation of moisture.**
10. **Judicious grazing in the early stages to achieve the objects of No. 9.**
11. **Keeping the pasture from seeding itself during the first year.**
12. **Judicious grazing and rotation, which means fencing off into small paddocks.**
13. **Top-dressing the pasture every Autumn.**



THE NEED FOR LIME:—Bear in mind that **Lime is one of the necessary plant food constituents**, consequently, it must be in any soil from which it is expected to produce crops. Lime also tends to liberate from its insoluble forms of combination another essential plant food substance in Potash, and thus converts it into a condition in which it is readily available to the plant as food. Lime is also an essential constituent for the development of the micro-organisms which bring about the formation of nitrates in soils, and it is also necessary to neutralise the acids that are naturally formed in the process of decay of the organic matter present in soils. It will thus be realised that **Lime has a very important function to perform**. Very often soil is over-provided with rich plant food locked up in an insoluble condition. The application of further fertiliser only tends to aggravate the position, but a dressing of Lime, as previously stated, will liberate the plant food from its insoluble forms of combination and convert ground which is very often sterile into rich country without any additional manure being required.

ECONOMICAL TO ESTABLISH:—One great advantage in laying down a permanent pasture mixture of Grasses and Clovers is that the **preparation of the land is a much less costly operation** than for Lucerne and other crops. Deep ploughing and thorough sub-soiling, a second ploughing, harrowing and rolling, grading, and the provision of adequate drainage facilities are essential with Lucerne, whereas the **special virtue of Grass and Clover pastures** is that **shallow soil and even gravelly country**, where deep-rooting pastures could not thrive, **may be advantageously utilised**, while the capability of Grasses and Clovers to withstand surface moisture permits their use in situations where Lucerne would be drowned out. For Grass and Clover pastures plough the ground from four to six inches deep as early as possible in the Autumn, or better still, in the Summer if conditions permit, working the land down to a mellow tilth with a tine harrow, a double-disc harrow, a scarifier, and, if necessary, a roller, so as to provide a fine, level, shallow seed bed, and thus obviate the possibility of the small seeds being buried too deeply.

FERTILISER:—While natural manure is to be preferred to artificial fertiliser, the former is generally a very scarce commodity, so the commercial article must be relied on. While Superphosphate gives good results a **little extra outlay on the initial application** and the use of a mixture containing two-thirds Superphosphate and one-third Bone Dust will be found a really good investment. About **112 lbs. per acre** is a fair average quantity to reckon on, but some land may require this quantity to be increased up to **as much as 168 lbs. per acre**. To save labour, fertiliser can be mixed with the seed and sown through the manure hose of the control in the one operation, but seed and fertiliser **must not be allowed to stand mixed** for any length of time, otherwise the manure is apt to burn the seed and impair its germination.

GRASS AND CLOVER PASTURES. (Continued.)

MIXTURE AND CLIMATIC CONDITIONS:—Owing to variations in soil and climatic conditions no one mixture can be adopted as a standard. The facts to be taken into consideration in determining the most suitable mixture are the climatic conditions of the district, whether the rainfall can be relied on or whether irrigation must be practised in dry weather, and the particular class of soil to be sown down. In many instances a few ounces of "Tarwei" Strawberry Clover per acre can be added with advantage. Strawberry Clover has particular soil requirements, and where these are suitable, there is no better permanent pasture plant. In many Grass and Clover paddocks grown under irrigation, there are depressions and swampy patches where the water may lodge for several days, and in such cases, while it is not necessary to include "Tarwei" Strawberry Clover (which is a fairly costly seed) in the mixture, it is advisable to get a small quantity and to broadcast separately by hand on these moist patches. (See pages 43, 44 for list of selected "Standard" Brunning Mixtures).



The Effect of scientific Top-dressing. The figure on the left shows the result attained with Superphosphate plus one cwt. per acre of Sulphate of Ammonia applied in April. The illustration on the right shows portion of the same plot treated with Superphosphate only.

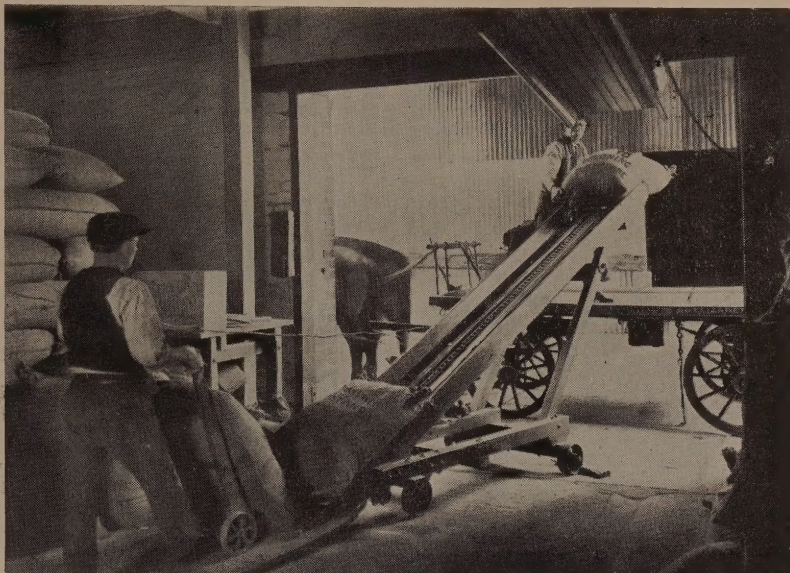
The higher the fertility of any Grass, the greater the amount of fertiliser necessary to maintain the maximum standard of productivity. Perennial Ryegrass or Cocksfoot for example require considerably larger quantities of manure than a low grade grass such as Yorkshire Fog. Regulate your manuring accordingly.

WHEN TO SOW:—For districts where natural rainfall has to be relied on, the best time for sowing is with the first Autumn rains, although in some districts where a reasonably moist Spring and early Summer may be expected, the first half of August is not too late. These remarks also apply to districts where the pastures are to be grown under irrigation, but seeding as early as possible after the first Autumn rains is the ideal time, as it enables the Grasses and Clovers to establish themselves during the Winter and early Spring, and in dry districts, where irrigation must be practised, by the time it is necessary to water, the roots of the plants have obtained a firm hold in the soil. **Fairly thick seeding** is essential, especially under irrigation, and it is most important that only the **best quality seed** is used.

HOW TO SOW:—The seed may be either broadcasted or sown in rows. The most economical method, and one which provides for uniform distribution, is to sow through the grain run of a seed drill. For broadcasting use a Cahoon Hand Sower, while for drilling, any Standard Seed Drill sowing in rows **seven (7) inches apart** will fill all requirements. If drilling, take the hose out of the shoe and allow to hang loose. While sowing the seed, stir the mixture every couple of rounds to ensure an even distribution, and on completion, **roll the ground lightly** to compact the seed and soil. Finally, bear in mind that Grasses and Clovers are small seeds and **must not be buried**. Therefore, it is **essential** that **deep seeding be avoided**. When sowing under irrigation, give the land a good watering a few days before you are ready to proceed with seeding, and after allowing the water to soak in, sow the seed as soon as you can get on the ground thereafter. On no account, irrigate after seeding, but wait until the seed is through and Grasses clearly showing, otherwise the seed is apt to be washed out and a patchy stand will be the result.

GRASS AND CLOVER PASTURES. (Continued.)

EARLY PRODUCTION OF THICK SWARD:—Having finally completed seeding, the **subsequent treatment** of the pasture must be such as to contribute to the earliest and most complete covering of the ground with a thick sward or mat of pasture, and in comparatively dry districts, such as Northern areas of Victoria, it is essential that this be accomplished before the first hot spell of Summer, both to **avoid surface caking of the soil**, and to **check excessive evaporation**. These remarks, however, also apply to Gippsland and the Western District, where natural rainfall is relied on. As soon as the grass shows up a few inches, let a small number of sheep in on the paddock, but be especially careful never to overstock, only feeding off enough so that the **grass can keep a little ahead** of the stock. The effect of this treatment will soon be seen in the way in which the grass begins to stool, and soon the whole area will assume something of the appearance of a well-kept city lawn. The Clovers in the pasture are, as a rule, slower in the early stages of growth, and are not so manifest at first.



Special Portable Loading Machine at Brunning's South Melbourne Bulk Store.

AVOID SEEDING IN EARLY STAGES:—Another point in the successful maintenance of these pastures is to **prevent seeding in the early stages**, although later on, the Ryegrass at any rate may be allowed to mature. To avoid continual grazing, which would be prejudicial to the pastures, the holdings should be fenced off into small paddocks which can be grazed in rotation, thus preserving a continued succession of valuable feed, and at the same time enabling those pastures already fed off to recover before again being grazed.

TOP-DRESSING:—Finally, to maintain the pastures in first-class condition, and to improve the quality of the feed, **top-dress** the paddocks **with Superphosphate each year** as soon as conditions permit in the early Autumn, applying manure at the rate of **112 lbs. to the acre**. Grass and Clover pastures will stand more abuses than Lucerne, but they will not endure as much neglect, and to secure the best results the plants comprising same must be kept growing without check. Remember, however, that **top-dressing is only one step** in pasture improvement and that to get the fullest value for the outlay on manure it is essential that the **other details of good management** also receive attention.

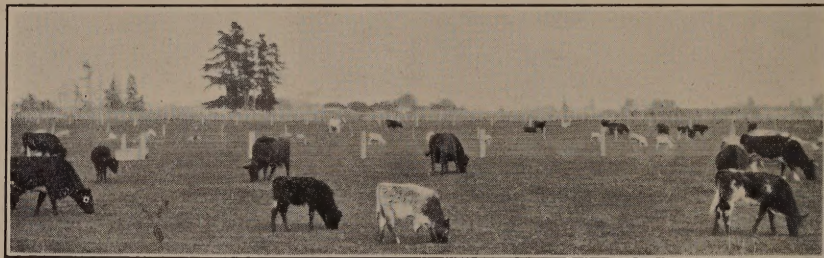
BRUNNING'S SERVICE:—A mixture carefully made up with due regard to the soil and climatic conditions is very essential and for this reason we refrain from quoting any specific mixtures which may only mislead the reader, but will be only too pleased to give advice and **make recommendations without charge or obligation**, on receipt of details of soil, average rainfall, or whether irrigation facilities are available, and the purpose for which mixture is required. In conclusion, let us once more emphasise **the necessity for using seeds of the highest purity** i.e., thoroughly and efficiently machine dressed to be free of weeds and foreign matter, **as well as of the best strain**. The average farmer well realises the value of "blood" in cattle or sheep and will pay big money to get the right strain. The same thing applies equally to Grass and Clover seeds. The actual cost of the seed in comparison to the other expenses of laying down and maintaining a pasture is so small that a cutting down of a shilling or two per acre in the first place may easily mean a big loss eventually, having due regard to the other capital invested in the particular venture.

THE VALUE OF PRAIRIE GRASS

Lucerne is too well known as one of the leading fodder plants of Australia to need any further description, but its period of usefulness (except in the case of stored hay) is limited to the late Spring, Summer and Autumn, and in no respect is it an 'all-the-year-round' fodder. In this connection the deficiency may be filled by using a possibly **less well-known although equally valuable and high-grade fodder** in Prairie Grass, which with **less attention than is required** to grow Lucerne successfully will do through the cooler period of the year all that Lucerne will do in the late Spring, Summer and early Autumn, and a reasonably fair trial is all that is necessary to prove that this permanent pasture is, during its period of production, of equally as high value as Lucerne. Under average conditions, and with proper treatment of the pasture, an average of over a cow to the acre may be milked on Prairie Grass right through the Winter.

UTILITY:—Prairie Grass may be grazed, cut for green feed or saved for a hay crop, and all these are of the highest feeding value while the herbage is perhaps the **most palatable fodder known**. So highly palatable is Prairie Grass that it is **inadvisable to sow the plant in mixture** with other Grasses and Clovers as stock will eat out the Prairie and neglect the other ingredients in the pasture. The plant will give excellent results in Gippsland, the Western District of Victoria and other localities with a similar rainfall, as well as in Northern Victoria where ample facilities for irrigation are available. Prairie Grass is not a drought-resistant fodder in dry, hot districts.

SOIL:—Prairie Grass does well in most good soils, but gives the **best results in moist or slightly damp ground**. Being a gross feeder, **fairly rich land is essential**. A properly prepared seed bed is well repaid and is worth while considering the permanency of the plant with proper treatment.



SEED SOWING:—The best time for sowing Prairie Grass seed is in the **Autumn or early Winter**, although seeding may be made as late as September in districts where there is a good late rainfall or where irrigation is available. The seed is generally sown broadcast, using a Cahoon sower, under which conditions from **30 to 40 lbs. of high class seed of strong growth** is required to sow an acre. After seeding, it is advisable to **harrow and roll**.

SUBSEQUENT TREATMENT:—As soon as the grass shows up about four or five inches, let a few sheep run in the paddock, **being careful not to over-stock** but just feeding off enough to let the grass keep ahead of the stock. This will cause the plants to stool out, after which, the crop may be allowed to attain greater growth, when it may be more heavily pastured with horses or cattle if required or allowed to run up for a hay crop. **Prairie Grass does not stand heavy continuous grazing** and for that reason is best grown in small paddocks to permit of spelling regularly, otherwise it is liable to be eaten out. **Small paddocks**, not allowing stock to pasture too heavily or too long on any one block, **reasonable spelling** between grazings and **top-dressing will maintain an established Prairie Grass pasture** in a high state of productivity for many years. After the Spring flush of herbage comes, grazing may be discontinued and the paddocks shut up to yield a crop of hay heavier than Oats would average, and a hay which is **more palatable to stock than either that from Wheat or Oats** and quite equal in every way to Lucerne hay. By feeding this hay to the stock, Prairie Grass may be established through the animals on any suitable spots on the property, especially on tussocky flats where the Prairie can find effectual shelter and spread.

One great essential to preserving the permanency of Prairie Grass is protection of the exposed crown of the plant during dry, hot weather and for this reason, grazing must be discontinued during the late Spring, Summer and early Autumn. Indeed even in Winter, it will be found more profitable to cut and feed this grass.

FERTILISER:—Prairie Grass is a gross feeder and well repays manuring. A top-dressing in the early Autumn each year will be found profitable. Where available, farmyard or sheepyard manure is recommended, but when not obtainable, a dressing of **140 lbs. per acre of Superphosphate and Bone Dust mixed** will prove a good substitute.

SEED:—As with other pastures laid down for a number of years, the use of the highest quality, plump-bodied, strong germinating seed free from smut is essential and in this respect, **Brunning's Supergrade Machine-Dressed Prairie Grass**, together with attention to the preceding directions can always be relied on to ensure satisfactory results.

A WELL BALANCED WINTER AND SPRING PERMANENT PASTURE

Wimmera Ryegrass and Subterranean Clover.

The two **principal essentials** in determining the most productive pasture types for any particular district are **soil moisture conditions** and the **fertility of the land**. The former governs the annual or the perennial nature of the plants composing the pasture while the latter controls the actual species of annual or perennial plants that may be sown and maintained to best advantage from an economic point of view.

Wimmera Ryegrass is in the same relation to Perennial Ryegrass as is Subterranean Clover to White Dutch Clover. **Both are annuals**, depositing their seed at the end of each growing period to perpetuate next season's crop, and both have a distinct "niche" in both high and low rainfall areas, though under the former conditions they should not replace perennial pasture plants on good quality soils. Another point of similarity is that both will thrive and do well on second, and even third class land, where the average annual rainfall is high, but when grown under low rainfall conditions each of them require relatively fertile soil.



Where Pastures are poor and thin, stock have to travel over larger areas, tracks are worn and plants destroyed, while the animals lose their condition. Succulent pastures, regularly top-dressed produce contentment and the beasts fatten rapidly. Don't neglect your top-dressing. It pays in every way. See also article on pages 54, 55.

This mixture of Wimmera Ryegrass and Subterranean Clover may be sown on a well-prepared seed bed in the **Autumn or early Winter**, or in cases where late rains are assured, in the early Spring, although, generally speaking, Autumn or early Winter seeding is much safer, sowing at the rate of from **10 to 12 lbs.** of Wimmera Ryegrass and **2 lbs.** of Subterranean Clover per acre.

Under grazing conditions it is extremely difficult to maintain a proper balance between Subterranean Clover and Wimmera Ryegrass. Each plant demands a separate method of grazing.

Subterranean Clover in its young form is somewhat unpalatable, while at the same stage Wimmera Ryegrass is extremely palatable. Thus, in Winter, the stock are liable to severely punish the Ryegrass, to the advantage of the Clover, and in addition, Subterranean Clover, owing to its extremely prolific growth tends to choke it out. This difficulty is accentuated when at seeding time Subterranean Clover protects its seed by burying it, while the Wimmera Ryegrass seed is readily grazed by all types of stock. Thus, as the seasons go on and the pasture re-establishes itself each year by re-seeding, there is a gradual increase in Clover and decrease in Rye Grass.

It would therefore appear to be better policy to sow Wimmera Ryegrass and Subterranean Clover in separate paddocks, and, indeed, under such conditions it can be grazed to the best advantage, and the Ryegrass allowed to seed heavily by removing the stock for a few weeks in the late Spring. Rye grass is not a good plant to produce **dry Summer feed** and for this purpose the **Subterranean Clover** is much to be preferred

WIMMERA RYEGRASS & SUBTERRANEAN CLOVER MIXED PASTURES. (Continued.)

Although in many instances it may be preferable to keep Subterranean Clover and Wimmera Ryegrass in separate paddocks, yet **there are considerable areas where the two may be advantageously combined** to give a good mixed pasture and under such conditions, the proper balance between the two plants may be kept in several ways:—

- (1) **By light stocking**, especially when the Wimmera Ryegrass is seeding, and followed by Autumn harrowing.
- (2) **Under heavy stocking** conditions, re-seeding with Wimmera Ryegrass every few years, at the Autumn harrowing, to increase the grass content if necessary.
- (3) **By judicious manuring** with phosphates and nitrogen, and by careful control of grazing, it is possible to maintain both plants in their correct proportion.

Wimmera Rye responds well to Autumn and early Spring dressings of nitrogen, provided the phosphate content of the soil is high.. **Carefully controlled grazing is essential to prevent** the Wimmera Ryegrass getting too high in the late Autumn, and thus smothering the young Clover plants. If the pasture is kept grazed and not allowed to exceed from 3 to 4 inches high, one may keep the balance between Clover and Ryegrass.



Stock fattening in a top-dressed mixed pasture.

To keep the pasture in the best condition, **top dressing is essential, and, generally speaking, 1½ cwt. of Superphosphate per acre** applied immediately after the Autumn harrowing and followed by an application of about **1 cwt. of Sulphate of Ammonia per acre** about the middle or end of May will give the best results. Under certain conditions, a further top dressing of Sulphate of Ammonia about the end of July would prove helpful in producing early Spring feed and maintaining the Wimmera Ryegrass—Subterranean Clover balance.

Wimmera Ryegrass and Subterranean Clover have now definitely established the value of their association for Winter and Spring pasture for the following reasons:—

- (1) **Both are annuals** and will withstand dry Summer conditions and re-establish themselves by profuse re-seeding, if managed in the correct way.
- (2) **They give a good balanced ration** to stock when fed in conjunction with each other.
- (3) **Wimmera Ryegrass will supply feed in Winter** when Subterranean Clover is not at its best, and is rather unpalatable.
- (4) **The Wimmera Ryegrass will produce feed** when the clover is attacked by the ravages of insect pests such as red spider and lucerne flea.
- (5) **Both will grow profusely in areas with an annual rainfall as low as 15 inches, providing,** of course, the soil fertility is sufficiently high.
- (6) **They respond splendidly to balanced manuring** with phosphates and nitrogen to give Winter feed.
- (7) **The Wimmera Ryegrass materially helps to counteract the "clover taint"** in butter.

Wimmera Ryegrass and Subterranean Clover **when sown alone as separate crops** are dealt with in another portion of this book. (See pages 24 and 51). The above article is to illustrate the usefulness of these two Permanent Pastures in conjunction. It is advisable at all times that only the best and most reliable seed be used whether in mixture or sown separately.

PERMANENT PASTURE MIXTURES

The following Mixtures, which are submitted as specimens, are all based on practical experience of previous success. These Mixtures may not cover all requirements, and when in doubt, readers are requested to **write to Brunnings, Box 857K, Melbourne**, giving details of soil, etc., when, if necessary, special recommendations will gladly be submitted free of charge and without obligation to purchase.

Mixture No. 2001.

- 15 lbs. Perennial Ryegrass
- 5 lbs. Italian Ryegrass
- 5 lbs. Westernwold's Ryegrass
- 3 lbs. Cocksfoot
- 1 lb. Crested Dogstail
- 2 lbs. Cow Grass
- 1 lb. Alsike Clover
- 1 lb. White Clover
- 1 lb. Cluster Clover
- 1 lb. Subterranean Clover
- (35 lbs. of seed per acre.)

Mixture No. 2003.

- 25 lbs. Perennial Ryegrass
- 2 lbs. Alsike Clover
- 2 lbs. White Clover
- 2 lbs. Cow Grass
- 9 lbs. Italian Ryegrass
- (40 lbs. of seed per acre.)

Mixture No. 2009.

- 15 lbs. Perennial Ryegrass
- 4 lbs. Timothy
- 3 lbs. Creeping Bent
- 1 lb. Crested Dogstail
- 3 lbs. Sweet Clover
- 1 lb. White Clover
- 1 lb. Alsike Clover
- 1 lb. Subterranean Clover
- (29 lbs. of seed per acre.)

Mixture No. 2012.

- 20 lbs. Old Pasture Ryegrass
- 3 lbs. Creeping Bent
- 1 lb. Alsike Clover
- 1 lb. "TARWEI" Strawberry Clover
- (25 lbs. of seed per acre.)

Mixture No. 2013.

- 20 lbs. Perennial Ryegrass
- 20 lbs. Italian Ryegrass
- 4 lbs. Cocksfoot
- 2 lbs. Cow Grass
- 1 lb. Alsike Clover
- 1 lb. White Clover
- 2 lbs. Lucerne
- $\frac{1}{2}$ lb. Subterranean Clover
- (50 $\frac{1}{2}$ lbs. of seed per acre.)

Mixture No. 2015

- 20 lbs. Perennial Ryegrass
- 8 lbs. Timothy
- 6 lbs. Cocksfoot
- 2 lbs. Alsike Clover
- 2 lbs. Cow Grass
- 2 lbs. White Clover
- (40 lbs. of seed per acre.)

Mixture No. 2017.

- 20 lbs. Perennial Ryegrass
- 7 lbs. Cocksfoot
- 2 lbs. Kentucky Bluegrass
- 2 lbs. Chewing's Fescue
- 2 lbs. Cow Grass
- 2 lbs. Sweet Clover
- 1 lb. Subterranean Clover
- (36 lbs. of seed per acre.)

Mixture No. 2019.

- 10 lbs. Ryegrass
- 3 lbs. Cocksfoot
- $1\frac{1}{2}$ lbs. Crested Dogstail
- $\frac{5}{8}$ lbs. Yorkshire Fog Grass
- 1 lb. White Dutch Clover
- 1 lb. Sweet Clover
- $1\frac{1}{2}$ lbs. Cow Grass
- (23 lbs. of seed per acre.)

Mixture No. 2002.

- 2 lbs. Crested Dogstail
- 1 lb. Creeping Bent
- 5 lbs. Italian Ryegrass
- 3 lbs. Cocksfoot
- 3 lbs. Perennial Ryegrass
- 1 lb. White Dutch Clover
- $1\frac{1}{2}$ lbs. Cluster Clover
- $1\frac{1}{2}$ lbs. Sheep's Trefoil
- $\frac{1}{2}$ lb. Subterranean Clover
- $\frac{1}{2}$ lb. Alsike
- (19 lbs. of seed per acre.)

Mixture No. 2004.

- 25 lbs. Perennial Ryegrass
- 10 lbs. Cocksfoot
- 2 lbs. White Dutch Clover
- 2 lbs. Cow Grass
- 1 lb. Alsike Clover
- (40 lbs. of seed per acre.)

Mixture No. 2010.

- 15 lbs. Perennial Ryegrass
- 5 lbs. Cocksfoot
- 1 lb. White Dutch Clover
- 2 lbs. Alsike Clover
- 2 lbs. Sweet Clover
- 2 lbs. Crested Dogstail
- 2 lbs. Timothy
- 1 lb. Giant Colonial Cowgrass
- (30 lbs. of seed per acre.)

See Pages 33 to 39 for Laying
Down Pastures.

Mixture No. 2014.

- 25 lbs. Perennial Ryegrass
- 5 lbs. Italian Ryegrass
- 5 lbs. Westernwold's Ryegrass
- 4 lbs. Cocksfoot
- 3 lbs. Creeping Bent
- 1 lb. White Clover
- $1\frac{1}{2}$ lb. Alsike Clover
- $\frac{1}{2}$ lb. "TARWEI" Strawberry Clover
- (45 lbs. of seed per acre.)

Mixture No. 2016.

- 20 lbs. Perennial Ryegrass
- 5 lbs. Cocksfoot
- 3 lbs. Wallaby Grass, Pilosa
- 1 lb. White Clover
- 2 lbs. Cow Grass
- 1 lb. Alsike Clover
- (32 lbs. of seed per acre.)

Mixture No. 2018.

- 20 lbs. Perennial Ryegrass
- 7 lbs. Cocksfoot
- 1 lb. Crested Dogstail
- 1 lb. White Clover
- 1 lb. Cow Grass
- 1 lb. Alsike Clover
- 1 lb. Subterranean Clover
- (32 lbs. of seed per acre.)

Mixture No. 2020.

- 20 lbs. Perennial Ryegrass
- 10 lbs. Italian Ryegrass
- 5 lbs. Cocksfoot
- 2 lbs. White Clover
- $1\frac{1}{2}$ lbs. Sweet Clover
- $1\frac{1}{2}$ lbs. Cow Grass
- 1 lb. Subterranean Clover
- (41 lbs. of seed per acre.)

PERMANENT PASTURE MIXTURES. (Continued.)

Mixture No. 2021.

12 lbs. Wimmera Ryegrass
1 lb. Kentucky Bluegrass
2½ lbs. Sweet Clover
½ lb. Subterranean Clover
(16 lbs. of seed per acre.)

Mixture No. 2022.

10 lbs. Paspalum Dilatatum
1 lb. "TARWEI" Strawberry Clover
1 lb. White Dutch Clover
15 lbs. Perennial Ryegrass
(27 lbs. of seed per acre.)

Mixture No. 2025.

15 lbs. Perennial Ryegrass
6 lbs. Cocksfoot
6 lbs. Paspalum Dilatatum
3 lbs. Cow Grass
2 lbs. White Dutch Clover
2 lbs. Subterranean Clover
(34 lbs. of seed per acre.)

Mixture No. 2026 (Recommended by the Water Supply Commission.

10 lbs. Perennial Ryegrass
3 lbs. Cocksfoot
1 lb. White Dutch Clover
1 lb. Alsike Clover
3 lbs. Italian Ryegrass
2 lbs. Cow Grass
1 lb. Subterranean Clover
½ lb. Strawberry Clover
(21½ lbs. of seed per acre.)

SOILS AND CONDITIONS FOR MIXTURES.

MIXTURE No. 2001 is suitable for medium to good quality soil, and should also give good results under irrigation. Italian and Westernwolt's Ryegrass have been included to get a quick start as well as some Cluster Clover to put a good sole in the pasture.

MIXTURE No. 2002, is for fair average quality virgin country which has recently been burned off. It should be suitable for King Island, Tasmania, and should do well using the ashes as a seed bed and without any other soil preparation, while **MIXTURE No. 2003** was very successfully established some years ago at Stanhope, and can be recommended for certain classes of irrigable land. This is a good general purpose mixture for Northern Victoria, while **MIXTURE No. 2004** may be regarded as a good general permanent pasture mixture for Gippsland and other cool districts with a good Summer rainfall.

MIXTURES Nos. 2012 and 2022 are suitable for pasture purposes on moist and swampy country. For wet or acid soils No. 2012 is recommended, while it is also suitable for heavy black loamy ground, drained peaty swamps and for land liable to flood. These mixtures are suitable for Gippsland, the Western District of Victoria, and districts with a similar climate and rainfall. No. 2022 is better adapted to light soil and should do very well on swampy country in temperate to warm climates. This mixture is perhaps better adapted to Northern New South Wales than Victoria. Its use under irrigation is not recommended, owing to the inclusion of Paspalum Dilatatum.

MIXTURE No. 2009 is a good mixture for warm districts for sowing on medium class land that is slightly moist. It can also be used to advantage for medium to good quality land in temperate climates with a heavy rainfall, while **MIXTURE No. 2010** has already been grown throughout the Goulburn Valley District and other parts of Northern Victoria under irrigation with most satisfactory results. This mixture, in particular, can be especially recommended for using in and around Shepparton, and the results there were so striking that a special enquiry regarding the ingredients was made by the Local Officer of the Closer Settlement Board for future reference. **MIXTURE No. 2013** is a mixture that has given excellent results to Mr. A. Glass, of Nanneella.

MIXTURE No. 2014 has been made up for growing under irrigation on land inclined to be slightly moist, while **MIXTURE No. 2015**, although suitable for general purposes, is more particularly to be recommended where the pasture is being relied on for hay, rather than for grazing. This mixture can be recommended for Southern Victoria, as well as for growing in the Northern areas under irrigation, and is suited to from medium to good quality soil. **MIXTURE No. 2016** has been made up for second and third-class country, and for sowing on land where the better known Grasses and Clovers will only stand for a few years. The other ingredients are really included as a cover for the Wallaby Grass, which is slow in establishing itself, but which will eventually take possession of the pasture. This mixture is recommended for poor, dry, hilly land in the colder climates, especially on sheep-grazing country. When not required for pasture it may also be cut for hay.

MIXTURE No. 2017 has been specially designed for a permanent pasture for good quality land in rather dry situations and medium to mild climates where irrigation facilities are not available. It will also give excellent results on good quality land where irrigation facilities are somewhat limited, but is not suitable altogether for dry farming in Northern Victoria. **MIXTURE No. 2018** is a good, general permanent pasture mixture that can be thoroughly recommended for Gippsland and similar climates on medium to good quality land, while **MIXTURE No. 2019** has been made up for second and third-class land where Grasses and Clovers will not stand, and where a permanent pasture of three or four years' duration is all that is desired.

MIXTURE No. 2020 is very suitable for growing on medium quality land, and for getting a quick cover. Italian Ryegrass having been included for this purpose. Many clients require a mixture for dry districts in Northern and North-Western Victoria, and **MIXTURE No. 2021** has been made up for this purpose. It is suitable for the Mallee and those parts of North and North-Western Victoria, which do not possess irrigation facilities, and with only a limited rainfall. **MIXTURE No. 2025** should not be sown in first-class river flats or top grade land, but is most suitable for second-class country, and is well adapted to many parts of Gippsland and the Western District of Victoria.

MIXTURE No. 2026 is one recommended by the Officers of the State Rivers and Water Supply Commission as one of the most suitable for assuring good pastures. In our opinion, this mixture should include more Grass Seed per acre. See "Morning Sun" 30/12/30 for full report.

PASPALUM DILATATUM

(Golden Crown Grass).

Paspalum Dilatatum or Golden Crown Grass is a native of South America introduced into Northern New South Wales many years ago. It is a perennial of strong deep-rooting habit, which enables it to become thoroughly established, and on moist ground, under favourable climatic conditions, it is rather hard to eradicate. It is of bunchy or tussocky growth, with leaves numerous near the ground, but very few on the stems, and while it has a tendency to spread to land where it is not wanted, this can be overcome by laying down a limited area only and keeping it in check by sowing the nearby portions of the holding with other fodder crops which require constant cultivation. Another disadvantage is its excessive root development, which in time mats the ground to such an extent that the grass is eventually choked and dies off, but this, however, may be easily controlled by ploughing and cultivating.



Giving fresh life to soured pastures. The "Sungrowth" *Paspalum* Renovator on a North Coast Dairy Farm in N.S.W.

UTILITY:—*Paspalum Dilatatum* may be used both for pasture and as a hay grass. It is suitable for grazing dairy cattle, yields a large quantity of herbage palatable to all kinds of stock, and under reasonably congenial weather provides pasture for a considerable period of the year, the dormant period being during the Winter. Being soft and succulent and not wiry like many other grasses, **cattle will eat almost every part of the plant**, and this is a desirable quality as when grown for permanent pasture, **it must be kept well eaten down** to preserve its succulency and tenderness, as well as to prevent it from growing into objectionable tussocks. *Paspalum Dilatatum* may also be cut for hay, which especially when the plant is grown in mixture with one of the Clovers to make the right balance, is of very excellent quality.

CLIMATIC ADAPTABILITY:—Where soil conditions are reasonably suitable *Paspalum Dilatatum* can be successfully grown in all the States of Australia with the exception of Tasmania. In the colder localities the season of growth is much shorter, but in districts with a comparatively mild Winter once established *Paspalum Dilatatum* will hold in the ground and start into growth again with the first evidence of warm weather.

SOIL REQUIREMENTS AND PREPARATION:—*Paspalum Dilatatum* revels in a deep rich soil, and moisture is essential to success. It will grow splendidly in damp localities, and on swampy or marshy land liable to dry up and crack in the Summer, as owing to its deep-rooting habit, the roots penetrate well down into the ground and are thus able to withstand dry, hot Summers as well as a fairly long drought. Where conditions permit, the plant well repays a properly prepared seed bed but usually the seed is sown broadcast on the ashes after a burn, although providing the weather is mild at time of seeding, *Paspalum* will soon establish itself from seed with very little preparation of the ground.

Do not sow *Paspalum Dilatatum* on land intended to be irrigated either by itself or in mixture with other Grasses and Clovers. Apart from the possibility of the seed being distributed by stock there is always a very great danger of the irrigation waters carrying it to places where it is not required or to first-class land, and in this way it is liable to become a pest.

METHOD AND TIME OF SOWING:—Seeding can be carried out from the first rains in March to the end of April, and again from the end of August to the middle of October in districts with a comparatively mild Winter, but in localities where the cold weather sets in early and the Winters are more severe it would be advisable not to sow after the first week in April or before the middle of September. Sowing too late in the Autumn or too early in the Spring is not advisable, as if the soil is cold the seed is liable to hang in the ground and may possibly rot. Spring seeding generally gives the best results as the ground being warm the germination is speedy and the plants soon grow and establish themselves. As the seed of *Paspalum Dilatum* is very light and somewhat difficult to distribute, sowing through a drill is hardly feasible and the general and most convenient method is to broadcast, mixing the seed with dry sand to ensure an even distribution, and using from 7 to 8 lbs. of *Brunning's* Supergrade Hand-shaken re-cleaned seed per acre.

SUBSEQUENT TREATMENT:—When the plants are from 10 to 12 inches high, stock can be turned in for a few days at the rate of 3 or 4 beasts to the acre, so as to keep down the weeds until the *Paspalum* gets a good start. Do not allow the stock to remain too long on the pasture, otherwise the young plants are liable to be eaten down before thoroughly establishing themselves. The paddock can then be given a rest, and in a few weeks will be growing strongly; by this time the roots will have thoroughly established themselves, when the pasture can be grazed continuously. Owing to the excessive root development, which mats to such an extent that it will choke the plants, it is quite possible that after several years the pasture will go off, and will not respond satisfactorily to a top-dressing with fertiliser. At this stage, it will require renewing, and the best method is to plough and sow the ground down in Perennial Ryegrass, Cocksfoot and Mixed Clovers, or some other grass mixture suited to the soil and climatic conditions prevailing.



A Plant of *Paspalum Dilatum*.

This mixture will give good results for a certain period, and until the *Paspalum* again takes possession, or the old *Paspalum* sod may be broken up by double disc ploughing twice, three inches deep the first time, and deeper the second, following this by harrowing and cross harrowing. By this means, the roots are sufficiently broken to rejuvenate the pasture, after which top dress with Superphosphate, and then sow some White Dutch or "Tarwei" Strawberry Clover, using the latter for very damp localities. ***Paspalum* pastures give the best results** when they can be heavily stocked to prevent rank growth and close pasturing also allows for a better development of the plant, together with a greater stooling out of any Clovers when sown in mixture.

In the Northern Rivers district of New South Wales, the highest milk yields are secured by those farmers who keep their *Paspalum* pastured like a turf.

In a moist season, it often happens that *Paspalum* will grow quicker than the stock can keep it eaten down, and in this case the excess growth can be well utilised for hay. **The best time to cut** is just before the flowers appear, and by this means the woody, fibrous nature of mature *Paspalum* hay is eliminated. The hay can be readily cured, and when *Paspalum* is grown in mixture with either White Clover or "Tarwei" Strawberry Clover the result is a mixed hay of excellent quality, very palatable to stock.

QUALITY OF SEED:—Although it is produced very abundantly, seed of *Paspalum Dilatum* ripens unevenly and shatters easily; to secure the finest quality with the smallest proportion of immature or unripe seed (i.e. the highest percentage of germination), it is necessary to hand-strip or hand-shake. The machine-dressing is a later process to remove straws, dirt, light grains, etc.

MIXTURES:—*Paspalum* does well sown in mixture with Ryegrass, Cocksfoot and Clovers, and under such conditions is usually sown at the rate of 2 lbs. to the acre, the quantity varying according to the ingredients.

Paspalum Dilatum also grows exceptionally well in association with White Dutch Clover and also with "Tarwei" Strawberry Clover, making an excellently balanced ration.

MAKING PASTURE HAY

The value of pasture hay as a Winter fodder is becoming increasingly appreciated, and many farmers are making a regular practice of reserving a portion of their grass areas to be cut for hay.

Hay-making may appear simple, but there is plenty of room for skill in the work, particularly when the weather is not propitious. While in various districts the details of harvesting and stacking grass hay may vary slightly owing to climatic conditions as well as to a difference in the varieties of plants making up a pasture, in the main, the principles are similar. The principal consideration is to get a maximum quantity of hay rich in digestible nutrients.

The period of maturity at which grasses are cut for hay largely influences the bulk of the crop, as well as its palatability and value as a food, but it must also be remembered that careful handling after cutting is equally as necessary as is cutting at a particular time.

The time for cutting is when the bulk of the grasses of which it consists are coming into flower, that is, when the anthers or pollen sacs are thrusting between the chaff scales, for it is at this stage that the greatest amount of digestible nutrients will be obtained. If left beyond this stage, the nutriment is utilized to aid in maturing the seed so that the riper the grass, the more rapidly is the nourishment used by the developing seeds. In common with other forage crops, weather conditions greatly govern the time of grass-hay-making and the work should be carried out in such a manner that, on the approach of bad weather, the material can be got together with a minimum of handling and the exposure of the least possible surface to rain.



Cutting Sweet Clover for Hay.

The crop is usually cut with a mowing machine, or a scythe, leaving each swathe until the following day, to permit of the evaporation of moisture, as while freshly-cut grass may contain about 82 per cent. of water, grass hay should contain only about 18 per cent., and the superfluous moisture is got rid of by exposure to the sun and wind.

In drier localities, however, the crop may immediately be raked into small windrows. The next morning these are collected with a horse-rake into large windrows, and in the afternoon of the same day, might be run into cocks. When weather conditions are favourable, the gathering of the crop into cocks may be dispensed with altogether, and the hay carted from the windrows to the stack, an arrangement that means a minimum of handling, and with good weather, the hay will be in the stack on the third or fourth day after cutting.

On account of the damaging effect of rain, endeavour to harvest in fine weather, even though it means an early cutting, or possibly, in other circumstances, a late cutting. In this connection, it might be pointed out that, while early cutting may mean a loss in weight, it is offset to some extent by the increased aftermath growth. Though late cutting means a more fibrous crop, and one requiring more delicate handling, it is better than the crop cut just at the right time but subsequently damaged by rain.

When making hay from purely clover pasture, much gentler handling is required to prevent damage to the fine leaf. This crop can be left in the swathe for a day or two to allow the exposed surface to dry sufficiently, after which it should be carefully turned to allow the nether side to dry. When this is accomplished, the swathes are gently put in windrows, and thence carted directly into the stack, cocking being avoided if possible.

In stacking, the object is to exclude as much air as possible, and this is secured by spreading the hay evenly, and by trampling, so that fermentation will be kept within bounds. If the stack is properly consolidated in this way, the hay will develop an agreeable aromatic odour, and there will be no sign of mildew. Should the material be too green or too damp when stacked, heat generates to such an extent as to produce charring. This lessens the palatability of the hay, and is also liable to cause serious digestive derangements in the stock eating it.

PHALARIS TUBEROSA syn. BULBOSA

(Toowoomba Canary Grass).

The Phalaris family includes many species, most of which are worthless from a pasture improvement point of view, and the **type which has given such excellent results** for many years past as a Winter feed, and which was originally introduced into Australia under the name of Toowoomba Canary Grass, **is the perennial variety** which was originally known as *P. Commutata*, and later on classified as *Bulbosa*. For the sake of correctness and uniformity the leading Agrostologists of the World are now classifying the perennial, *P. Bulbosa*, **under the name of Tuberosa**, and in future the true perennial type of Phalaris suitable for pasture improvement purposes will be listed as such and offered for sale under that name.

VARIETIES:—No good purpose will be served by detailing a complete list of the various species of Phalaris, but for guidance it may be observed that apart from *Tuberosa* (syn. *Bulbosa*), those principally used are **Reed's Canary Grass** (*P. Arundinacea*) a useful perennial for marshes, swampy, boggy ground and similar classes of country, and **P. Minor** or annual Canary Grass, which produces the Canary seed of commerce. Phalaris Minor is an inferior plant and of no value for pasture purposes, its usefulness being confined to its production of seed for feeding birds.



Phalaris Tuberosa (syn. Bulbosa). A three-year-old stand at completion of growth in mid-Summer. By courtesy of the Waite Research Institute.

Recently another species has been introduced into America under the name of Harding Grass (*P. Stenoptera*) and promises to be a valuable addition.

Seed of Phalaris Tuberosa is much higher in price than that of *P. Minor*, which is sometimes sold as the true perennial type. *P. Minor* is only an annual and **care must be exercised in purchasing seed of P. Tuberosa** to ensure getting the true, perennial type. As it is impossible, except for an expert, to accurately distinguish between the seed of the two varieties, the only sure method is to **purchase Brunning's** true strain. Even so, it is impossible to secure seed of *P. Tuberosa* absolutely pure, owing to the readiness with which the members of this family cross-fertilise, but Brunning's true perennial *P. Tuberosa* seed can be relied on to be the right type, practically free of strangers and annuals and to give a good reasonable percentage of growth.

The **germination of P. Tuberosa** seed is as a rule **rather low**, 60 per cent. being considered exceptionally good, while an **average growth of from 40 per cent. to 45 per cent.** may be considered satisfactory.

CLIMATIC ADAPTION:—*P. Tuberosa* appears to have a pretty wide range of utility as far as Australian conditions are concerned. It was originally introduced into the Commonwealth under the name of Toowoomba Canary Grass and grown in that part of Queensland successfully for many years. It is also very largely cultivated in the New England district in New South Wales, and has been and is still being successfully grown in many parts of Victoria and South Australia.

UTILITY:—The chief value of *P. Tuberosa* is as a Winter and Spring fodder. The plant is not drought resistant in the strictest sense and its production is practically nil from the late Spring until mid Autumn. It appears to thrive in low temperatures, and is particularly **valuable on account of the way in which it withstands hard, cold conditions**. *P. Tuberosa* has been known to grow an inch or more a day in the depth of Winter. The plant makes a first class Permanent Pasture for grazing, is useful for cutting for green feed, and also yields a valuable hay crop. In New South Wales, *P. Tuberosa* is very successfully grown in conjunction with Tall Oat Grass.

PHALARIS TUBEROSA. (Continued.)

SOWING THE SEED:—The seed may be sown from the **middle of March** till the **middle of June**, **April being the ideal month** in most districts. As the germinability of the seed is not very high, the surest and most economical method of establishing a pasture is to raise the seedlings in a seed bed, and to transplant out any time from the end of May to August, in rows 3 ft. apart, spacing the plants from 24 to 30 inches in the rows. When raising in the seed bed and transplanting, **from 2 to 2½ lbs.** will supply ample seedlings for an acre, but when the seed is drilled in rows, **from 7 to 8 lbs.** will be required for the same area. As the seed is rather small it should be sown fairly close to the surface and the ground rolled after seeding.

SOIL CONDITIONS:—*P. Tuberosa* is not recommended for second or third class country, but otherwise, is not very exacting in its soil requirements, and will give excellent results on from medium light to medium heavy land providing it is of fairly good quality. Before sowing the seed for transplanting seedlings, **prepare the ground as recommended** for Permanent Pastures generally (see page 37), bearing in mind that this crop is destined to remain for a number of years and is well **worth a little extra trouble** in the initial stages of laying down.



A Three-year-old stand of *Phalaris Tuberosa* (syn. *Bulbosa*) in early Winter at the Waite Research Institute, Adelaide, to whom we are indebted for this photograph.

SUBSEQUENT TREATMENT:—During the first year or two as long as the plants permit, regular cultivation to conserve the soil moisture during dry weather is essential, but after this time, the plants will have expanded until they meet each other in the rows, when, of course, no further attention in this direction is possible. Once established, *P. Tuberosa* is thoroughly perennial and **grazed judiciously forms a close turf**, while if cut as soon as the flowerheads are formed, it yields a hay of first class quality.

A **top-dressing** of Superphosphate **each year about April or May** at the rate of **140 lbs.** to the acre, together with reasonable care in pasturing, will maintain this valuable permanent pasture in a high state of productivity for many years. Once established, *P. Tuberosa* is succulent, palatable to stock of all kinds and a strong grower, and being deep rooted is reasonably drought-resistant, although as previously stated, the plant is "off" during the Summer months of the year.

An alternative to the top-dressing with Superphosphate alone and one which has been **proved to give much better returns** is to use **112 lbs. Superphosphate together with 112 lbs. of Sulphate of Ammonia per acre**. The latter is to **supply the nitrogen content**, so essential to grasses of high fertility such as *Phalaris Tuberosa*. The article on **pages 54 and 55** deals fully with this associate system of manuring. Remember that the higher the fertility of any plant, the greater the amount of plant food (i.e. manure) to maintain the highest standard of productivity. For example **Ryegrass, Cocksfoot and Phalaris Tuberosa** being plants of high yielding capacity **require considerably greater quantities of plant food** to maintain themselves at the maximum standard than do poor low grade grasses as for example Yorkshire Fog Grass. Bearing this in mind **treat your pastures accordingly**. A good simile is the difference between the amount of coal required for a steamer doing say 12 knots per hour and one giving a speed of 17 knots in the same time. The greater the result required, the greater the feed (in this instance, coal) that is necessary to attain such result.

PHALARIS TUBEROSA. (Continued.)

SEED:—In view of the difficulty of detecting true seed of *P. Tuberosa*, except with the aid of expert means, it is essential that supplies be only purchased from a reputable Seed House. **BRUNNING'S true PHALARIS TUBEROSA** can be thoroughly relied on to be the true perennial type. Owing to the readiness with which the members of the *Phalaris* family cross-fertilise, it is quite likely that **even in the very best seed a crop will contain a percentage of strangers.** The characteristics of these strangers should be carefully noted and the field rogued as soon as it has been determined which is the true *Tuberosa* and which are the foreigners.

With reasonable treatment, once established, a pasture of *Phalaris Tuberosa* should remain in good order and condition for twenty years or more.



P. Tuberosa at Crookwell, N.S.W., by courtesy of the N.S.W. Dept. of Agriculture.

HARDING GRASS:—Harding Grass (*Phalaris Stenoptera*) was introduced into America from Africa about six years ago, and the results attained in that country point to this new introduction being a valuable addition to our permanent pasture plants. The chief features of Harding Grass as against *Phalaris Tuberosa* are its greater bulk of feed, its drought resistance and its permanency. **The American reports** are based on experience from the Pacific Coast States of Oregon and Northern California and **must not be regarded as being applicable** to Australian conditions.

Experiments are now being made here to determine whether under our conditions, *Phalaris Stenoptera* has sufficient advantages over *P. Tuberosa* to warrant its introduction to the exclusion of the older and better-known species. In America, owing to its crown spreading habit and Winter growth, it is considered that Harding Grass will to a large extent, control such pests as Bracken Fern, Californian Thistle, Nut Grass, Couch Grass and other troublesome plants.

The seed is not available, although indent orders will be accepted for those who are desirous of conducting their own experiments.

SOME NOTES ON LIME

The action of Lime on soils is threefold—**mechanical, chemical, and biological.** By its application, clay soils are rendered more friable and easy to work, while on light soils it exercises a binding influence. It helps to set free, to be utilised by growing crops, the natural store in the soil of potash and other food constituents. It decomposes organic matter, increases the favorable bacterial action, and, as is well known, it neutralises soil sourness, and in this way is a potent ally in combating many plant diseases that have their origin in soil acidity. As Lime enables crops to utilise more of the plant foods in the soil, the inference is plain: that it is essential to apply larger quantities of nourishment in the shape of fertiliser to replace that drawn on by the growing crop, otherwise soil poverty must ensue.

Lump quicklime, also called burnt lime or caustic lime, is the best known, and still the most widely used, but is gradually being superseded by the more convenient form of ground lime. Quicklime should contain about 90 per cent. of lime; thus a ton supplies approximately 18 cwt. of pure lime.

Ground lime is coming more into use every year. It is the lump quicklime, ground to a fine powder, being more convenient to handle, and capable of being more evenly distributed—advantages that are appreciated. It should contain about the same percentage of pure lime as lump quicklime. Ground lime absorbs moisture very quickly and swells in bulk as a consequence, so is not suitable for storage in bags.

Lime is a bone builder, and should be sown on the surface and harrowed in. Half a ton per acre is the minimum to apply to produce appreciable results, but 15, 20, or even 30 cwt. per acre will be found a very satisfactory dressing to apply to all soils. In most cases however, regular light dressings of Lime every second or third year are preferable, and better than one heavy dressing, say every 8 or 10 years.

WIMMERA RYEGRASS

A Most Desirable Winter and Spring Grass.

Wimmera Ryegrass (*Lolium Subulatum*) is a species of highly drought resistant Ryegrass of high feeding value, of the origin of which little is known. It was first discovered in the Wimmera district of Victoria, and is most likely a natural cross between the native grass (*L. Rigidum*) and either Italian or Perennial Ryegrass. Generally speaking, it matures earlier than either of the two latter, but there are many strains with very considerable variation in type. The best are leafy and succulent, while others are stemmy, wiry and harsh. Most are definitely annual, a few odd types showing a perennial habit, while some are early maturing with others relatively late.

As the various types are only just being separated, a commercial sample may contain a complexity of strains, and considerable re-selection is necessary to preserve the best quality types intact, so that although there may be slight variations in the best contract grown seed, the bulk of the plants produced from same would be found to be of the most desirable type; for this reason it is **advisable to buy only from reliable Houses** whose crops are regularly inspected and carefully supervised to maintain the highest standard of quality. In this respect, **Brunning's contract grown seed** can be confidently recommended.

Trials conducted by the Department of Agriculture at the Horticultural Gardens, Burnley, show the difficulty in maintaining any one strain or type 100 per cent. pure, but the most desirable variations are now being carefully selected and isolated, and in a few years it may be possible to put on the market **properly certified seed**, which can be relied on to produce the characteristics of its parent to the fullest extent.



UTILITY:—Wimmera Ryegrass may be **grazed**, **cut for green feed**, or, if desired, the last growth may be **saved for hay**, which is of splendid quality and excellent feeding value. Once established, the plant is **fully permanent** and by heavy seeding will re-appear year after year. In the earlier stages of growth it is extremely palatable and maintains its palatability through the season, although if allowed to get too long in seeding there is a large amount of waste, as stock do not relish the dry stalks after the seed is shed. The plants should therefore be grazed short and only allowed to run to seed when the dry period is beginning to set in, but at the same time it **should not be pastured late enough** to prevent reasonable seed formation.

IN MIXTURES:—The article on Pages 41 and 42 will be sufficient evidence of the value of Wimmera Ryegrass in mixture with Subterranean Clover. The plant also grows well in association with Sweet Clover, sowing **10 lbs.** of Wimmera Ryegrass and **4 lbs.** of Sweet Clover per acre. It is advisable to sow the Wimmera Ryegrass separately from the Clover and **to soak the seed of the latter** before sowing.

WHERE CAN IT BE GROWN:—Wimmera Ryegrass is **most adaptable to climatic conditions**, and in localities with a high rainfall will thrive on second or third class country, but in districts with a very light average rainfall, soil of greater fertility is necessary for the best results. Its chief value, however, is on low class types of red soil and on the classes of country in the Wimmera and Mallee of Victoria, which are of too poor quality to be productive to Wheat, but, owing to its very wide adaptability, it is a most valuable addition to our Permanent Pasture plants.

SOIL REQUIREMENTS:—In districts of high rainfall, Wimmera Ryegrass **should not be sown on good quality soil**, but in drier areas better class land is necessary if plants are to hold and give the maximum results.

No special soil preparation is necessary, providing the ground is harrowed or sufficiently loosened to make a seed bed to enable the roots to get a hold. With very heavy or stiff soil, more thorough preparation of the land is essential.

WIMMERA RYEGRASS. (Continued.)

WHEN AND HOW TO SOW:—The best time for sowing the seed is with the first Autumn rains, but Wimmera Ryegrass may be sown from March until about the middle of June. Owing to the habit and nature of the plant, later seeding would hardly be advisable except in very moist districts, when early Spring sowings may be successful.

The seed, when sown alone, is **broadcasted**, in which case from **15 to 20 lbs. per acre** is sufficient, or it may be sown with a cereal crop on land which it is proposed to rest. In such case, a light seeding only is necessary, otherwise the cereal crop may be interfered with, and under these conditions about 2 to 4 lbs. of seed per acre will be found sufficient.

THE SEED:—To be sure of getting the genuine Wimmera Ryegrass purchase your seed from a reputable House, and in this respect you cannot do better than use **Brunning's Genuine Contract grown stock**. There are so many variations of Wimmera Ryegrass that it is advisable to purchase reputable seed saved from paddocks which have been supervised to ensure as high a percentage of the best quality types as possible.



Wimmera Ryegrass growing and establishing itself in Saltbush Country.

SUBSEQUENT TREATMENT:—If the grass is required for permanency, judicious grazing is necessary at seeding time, especially during the first season. In any case, it is advisable to shut up the paddock the first season in the early Spring to give the plants an opportunity of seeding themselves heavily. Apart from this, no special treatment is necessary until the following Autumn, when the paddock should be harrowed to give the seed an opportunity to start with the first Autumn rains, and at this stage, a top-dressing of 112 lbs. to 168 lbs. of Superphosphate per acre, according to the class of land, followed by an application of 84 lbs. per acre of some Nitrogenous Manure (such as Sulphate of Ammonia) about the end of April or early in May, will materially benefit the pasture.

SUMMARY:—In conclusion, Wimmera Ryegrass (*Lolium Subulatum*) may be briefly summarised as an **annual withstanding dry Summer conditions and re-seeding itself profusely** if managed judiciously. Fed in conjunction with Clover, it yields an excellently balanced ration of high feeding value and is at its best stage of palatability in the Winter. Wimmera Ryegrass is **not attacked** by such pests as the **Red Spider** and the **Lucerne Flea** and produces good fodder when Clovers are suffering from the ravages of these insects. It grows profusely in areas with an annual rainfall as low as 15 inches, providing the general fertility of the soil is high enough. Wimmera Ryegrass helps to counteract the "**Clover Taint**" in butter and responds most readily to balanced top-dressing with Superphosphate and Sulphate of Ammonia to give feed during the Winter.

TESTING SOIL FOR ACIDITY

The need for Lime in any soil may be determined by the following simple test which will show the acidity or otherwise of the soil. The lack of this element may mean the difference between success and failure, hence the necessity for ascertaining its need or otherwise regularly from time to time. The method is:—

"Place some soil in a cup or glass with a trowel, not with the hand. Make it wet enough so that it can be stirred with a stick. Open a slit in the soil with a case-knife blade, and insert a piece of blue litmus paper obtained at a drug store. Press the soil against the paper. In an hour remove the paper. If it is distinctly pink, the soil is extremely acid. If it is faintly pink, the soil is slightly acid."

CATTLE PUMPKIN

The Cattle Pumpkin is a vinous plant with large broad leaves and a member of the Cucurbita family, which embraces the Rock, Water and Citron Melons, Squash, Vegetable Marrow and Cucumber. The Cattle Pumpkin to some extent bears the same relation to the table variety as does the Mangel to the culinary Beet, with the exception that some of the varieties, such as **Brunning's Turkscap, Crown, etc.**, are also suitable for domestic use.

UTILITY:—Owing to their excellent keeping qualities, they are not only useful for feeding as the Pumpkins mature, but form an excellent article of diet for Cattle, Pigs and Horses, during the Winter and early Spring, and help to vary the ration during those periods of the year. The Pumpkins may be cut into slices, or the tops slashed off with a tomahawk and allowed to remain in the field. Generally speaking, Pumpkins fed raw give as good results as when cooked. The **seeds** contain considerable nourishment, and **should not be removed** before feeding.

By feeding experiments, it has been shown that **one ton** of Pumpkins (including seeds) **equals** in feeding value for dairy cows about **333 to 400 lbs.** of mixed hay or **800 lbs.** maize silage. Generally speaking, Pumpkins are not suitable for sheep, although at a pinch they can be cooked, cut into small slices, and used for this purpose.



Pumpkin, Brunning's King of the Mammoths.

CLIMATIC RANGE:—Except in the very cold and mountainous districts there are few parts of the mainland of Australia where Cattle Pumpkins **cannot be successfully grown**, providing facilities for applying moisture during dry weather are available. This crop is very successful in such localities as Bairnsdale and Orbost, in Gippsland, as well as in Northern Victoria, thus emphasizing its wide climatic adaptability.

SOIL REQUIREMENTS:—

A deep, rich friable loam is the most suitable, but **good crops may be obtained** on all reasonably deep soils, providing they are well enriched with manure. In the first place **plough deeply**, and use the sub-soiler to thoroughly open up the ground so as to permit the roots to penetrate well into the soil. After the land has been prepared in this way, **make low mounds or hills about three**

feet in diameter, and twelve feet apart each way, leaving these hills slightly convex on the top. These mounds or hills must be well enriched with thoroughly rotted manure, as it is on this portion of the ground that the plant will principally rely for its nourishment.

The chief essential to securing heavy crops of Pumpkins is to keep the plants moving from the time they show above the ground, and everything that can be done to enrich the soil and increase its ability to retain moisture materially assists in achieving that end.

VARIETIES:—The best sorts of Cattle Pumpkin are **Ironbark, Brunning's King of the Mammoth or Potiron, Turkscap, Triamble, Button, Crown, and Connecticut Field.** Of these, Ironbark, Turkscap, Button, and Crown are also suitable for domestic use. The others are perhaps a little too coarse for the table, although excellent for feeding to stock.

WHEN AND HOW TO SOW:—The time varies according to climatic conditions, but in most parts of Victoria, about the **end of September or early October** is quite soon enough. Sow **four seeds** equal distances apart on each hill, and when the seedlings are through and growing well, **pull out the weakest**, leaving **only two plants** to produce the fruit. On this basis about **2 lbs. of seed** is required to sow an acre.

SUBSEQUENT TREATMENT:—Very little treatment is necessary apart from an occasional scarifying to keep the soil open and retain moisture as well as to destroy the weeds between the hills in the younger stages, but beyond this, little attention is necessary, as when the plants are growing strongly the **broad leaves will smother the weeds.** Under exceptionally dry conditions, it may be necessary to apply moisture, but this is a matter that must be left to the individual judgment. Where conditions permit, it is advisable to **pick off any early solitary blossoms** for the sake of a more uniform crop later. **Pinch back** the runners to force the plants to produce a dense mass of foliage over the roots, so as to resist dry, hot weather, as well as to increase the production of fruit.

WHEN TO GATHER:—Gather the fruit when ripe, but where required for storing during the Winter, pick just prior to this stage, taking care not to injure the stem, and leaving the fruits in the sun to mature and harden. The end of the stem will soon dry, and the Pumpkins can then be stored away in a dry, airy shed or cellar away from the frost. Be particularly careful not to bruise the fruit when handling, otherwise it will not keep.

WINTER GROWTH FROM PASTURES

The Necessity for Scientific Application of Nitrogen.

Grasses as a group of plants differ from Clovers in being unable to fix nitrogen from the atmosphere. Consequently, **grasses are unable to thrive in soils which are low in available nitrogen.** These facts explain the slow spread of good grasses when nitrogen is deficient and the rapid spread of clovers when phosphates only are applied to a soil.

The question may be asked, why do not good pasture grasses spread at the rate of the poorer grasses. For instance, why does not Ryegrass spread to the poor parts of the farm as do grasses such as Hair or Silver Grass (*Festuca bromoides*) and Brome Grasses (Goose Grass, etc.)? The answer lies in the statement that the **best grasses are the highest producing ones and they demand heavy supplies of available nitrogen** in the soil. Hence they do not thrive on poor or "low fertility" soils. On a soil which is short of nitrogen the grasses which demand little nitrogen will survive to the exclusion of the "high nitrogen demanders." This explains why in so many sown pastures the better grasses are gradually replaced by poor types.



Showing late Autumn growth when top-dressed with both Superphosphate and Sulphate of Ammonia. This photo was taken **on the same day and on the same pasture** as the illustration on page 55. Note the difference.

There is ample nitrogen present in most Victorian soils during the Spring and Summer for the requirements of even the best grasses. However, the supply is low during the cold months from May till September and the high producing or "high fertility" grasses are nitrogen starved, become stunted and shrivelled, and finally give way to the more hardy but less productive types.

BETTER GRASSES AND LESS WEEDS:—Thus it will be seen that to establish and maintain a pasture containing "high fertility" grasses, it is **essential to feed that pasture, firstly, with phosphate the year round, and secondly with nitrogen** during the Winter months when natural soil nitrogen is at low ebb. The former is rendered easy since Superphosphate is a relatively insoluble fertiliser and an application at the rate of 2-3 cwt. per acre once a year, preferably in the Autumn, will maintain a continuous supply of available phosphate for at least twelve months. **Nitrogen** in the form of Sulphate of Ammonia, however, is **very soluble** and immediately available. Consequently, it **should not be applied till required by the plant.**

The principal pasture grasses in common use which demand heavy nitrogen supplies and will repay the expense of annual dressings of sulphate of ammonia are as follows:—

Wimmera Rye Grass.
English or Perennial Rye Grass.
Italian Rye Grass.
Phalaris tuberosa.
Cocksfoot.
Prairie Grass.

Pasture mixtures containing these grasses should be seeded with superphosphate and at least 1 cwt. sulphate of ammonia per acre in the Autumn. A further dressing of 1 cwt. sulphate of ammonia per acre alone during the latter half of July will firmly establish these high fertility grasses and keep up a healthy vigorous growth till the advent of warmer weather and ample supplies of natural soil nitrogen in October and November. Many pastures are ruined in the first few months of establishment by an invasion of weeds, but if vigorous grass growth is maintained during the Winter with a good supply of nitrogen, this danger will be largely eliminated.

WINTER GROWTH FROM PASTURES. (Continued.)

MORE GRASS WITH NITROGEN:—A further valuable use of nitrogen is to prevent the clovers becoming dominant in pastures. Much trouble is experienced in Victoria annually by excessive clover diet, causing bloat and kidney disease in stock and "clover taint" in milk.

By the annual use of nitrogen, in addition to phosphate as explained above, a correct balance between grass and clover will be maintained. If, however, a pasture has become clover dominant, the quickest way to increase the grass content is to re-seed with grass, harrow and use nitrogen. The pasture should receive a drastic Autumn harrowing, followed by a fairly heavy re-seeding with good grasses, such as Wimmera Ryegrass for dry areas, or Perennial Ryegrass and Cocksfoot above 25in.-30in. rainfall. This re-seeding should be followed by a further drastic harrowing and an application of 1-2 cwt. per acre Sulphate of Ammonia in April and a further dressing in July, as explained earlier. In extreme cases the use of Superphosphate should be discontinued for a year or so.

This information is based on recent experimental work carried out throughout Victoria, and should help Victorian farmers to obtain higher production and more profit from their pastures.



This photo was taken on the same day and on the same pasture as the illustration on page 54. The above plot was top-dressed with Superphosphate only, no Sulphate of Ammonia being applied. Compare with page 54 and note the lack of growth and the poorness of the sward.

NITROGEN FOR WINTER GROWTH:—In addition to improving the establishment of highly productive pastures continued nitrogen applications to this type of pasture pay handsomely by producing valuable Winter grass. The great value of succulent Winter feed from pastures, particularly from the point of view of dairy farmers and fat lamb raisers, needs no elaboration here. Recent experiments in Victoria have shown that nitrogen applied at the correct time to the correct pastures gives the cheapest form of Winter feed.

Applications of Sulphate of Ammonia should be made to pastures containing ample "high fertility" grasses, firstly in the Autumn for May/June/July growth and again in July for August and September feed. This is necessary since Sulphate of Ammonia is a quick acting fertiliser, giving a flush of feed for the ten to twelve weeks immediately following application. Such applications of Sulphate of Ammonia in addition to giving Winter feed, will improve general soil fertility and help to maintain the better grasses.

The following precautions are necessary for best results from dressings of Sulphate of Ammonia:—

1. April and July are the best months for application.
2. Application should not be made in April unless the soil has been well saturated previously by good Autumn rains. If Autumn rains are late, delay the application till May or July. June is a bad month for application.
3. About the middle to the end of July is best for the Winter application.
4. Top-dressing should be applied when the grass is well grazed down.
5. The grass should NOT be wet when Sulphate of Ammonia alone is applied. Wait till the grass dries or top-dress when it is actually raining.
6. 1 cwt. per acre is the least quantity per acre that should be applied. 1 to 1½ cwt. is the best application.
7. Superphosphate should be applied as usual.
8. A poor light green or yellow color and dark green patchy growth here and there are indications of extreme nitrogen deficiency, and a dressing of 1 to 2 cwt. Sulphate of Ammonia will revive such pastures.
9. July seems to be the best month for application of nitrogen to Gippsland pastures.

ANNUAL WINTER FODDER MIXTURES

The annual Winter Fodder Crop Mixtures are perhaps better known as Four-Purpose Crops, on account of the four purposes for which they can be used, as follows:—

1. They give Winter fodder that can either be cut and fed, or grazed.
2. As the cutting kills the weeds, these mixtures are valuable for cleansing the land.
3. In each of these mixtures, a fair proportion of some legume is included so that the crop can be ploughed in for green manure, thus adding humus to the soil
4. These mixtures, even when not ploughed under, improve the soil as regards available nitrogen for succeeding crops.

Mixture No. 2031.

30 lbs. Rye Corn
30 lbs. Dun Peas
7 lbs. Golden Tares
25 lbs. Cape Barley
10 lbs. Algerian Oats
(102 lbs. of seed per acre.)

Mixture No. 2033.

4 lbs. Berseem Clover
30 lbs. Tick Beans
20 lbs. Algerian Oats
(54 lbs. of seed per acre.)

Mixture No. 2035.

30 lbs. Rye Corn
30 lbs. Partridge Peas
7 lbs. Golden Tares
25 lbs. Skinless Barley
(92 lbs. of seed per acre.)

Mixture No. 2037.

30 lbs. Dun Peas
30 lbs. Rye Corn
20 lbs. Cape Barley
10 lbs. Italian Ryegrass
(90 lbs. of seed per acre.)

Mixture No. 2039.

15 lbs. Italian Ryegrass
20 lbs. Algerian Oats
20 lbs. Tick Beans
5 lbs. Crimson Clover
(60 lbs. of seed per acre.)

Mixture No. 2041.

30 lbs. Dun Peas
20 lbs. Ryecorn
10 lbs. Algerian Oats
10 lbs. Italian Ryegrass
3 lbs. Crimson Clover
(73 lbs. of seed per acre.)

Mixture No. 2032.

30 lbs. Rye Corn
30 lbs. Partridge Peas
7 lbs. Golden Tares
25 lbs. Skinless Barley
10 lbs. Algerian Oats
(102 lbs. of seed per acre.)

Mixture No. 2034.

50 lbs. Skinless Barley
15 lbs. Horse Beans
20 lbs. Italian Ryegrass
(85 lbs. of seed per acre.)

Mixture No. 2036.

40 lbs. Algerian Oats
12½ lbs. Skinless Barley
30 lbs. Tick Beans
15 lbs. Golden Tares
15 lbs. Dun Peas
15 lbs. Rye Corn
(127½ lbs. of seed per acre.)

Mixture No. 2038.

4 lbs. Berseem Clover
40 lbs. Skinless Barley
(44 lbs. of seed per acre.)

Mixture No. 2040.

20 lbs. Skinless Barley
30 lbs. Black Oats
15 lbs. Rye Corn
3 lbs. Berseem Clover
(68 lbs. of seed per acre.)

Mixture No. 2042.

20 lbs. Dun Peas
20 lbs. Rye Corn
10 lbs. Sir Douglas Haig Oats
10 lbs. Cape Barley
20 lbs. Tick Beans
(80 lbs. of seed per acre.)

Mixtures Nos. 2031, 2037 and 2039 are all suitable for districts with a medium to cold climate, and are suitable for Gippsland and Tasmanian conditions. Mixtures Nos. 2032, 2035 and 2036 will do well in most parts of Australia except very cold districts, and need to be sown early in Gippsland or the Western District of Victoria. Mixtures Nos. 2033 and 2034 will give fair results in Gippsland, but must be sown early, and are really adapted to the Goulburn Valley, the Northern and North-Western Districts of Victoria, the Griffith, Leeton and Yanco Irrigation Areas in N.S.W., and localities with a similarly mild Winter, and require to be sown early to derive the maximum advantage as also does No. 2038. Mixture No. 2040 is a prescription specially made up for very early feed, and is only recommended for places with a mild Winter. It must be sown early, and under such conditions will give several cuttings or a good bulk of green feed. No. 2040 is also useful for saving for hay from the last cutting if not taken too late in the Spring.

Mixtures Nos. 2041 and 2042 are thoroughly hardy and suitable for all parts of Victoria, although irrigation is necessary in districts with a limited rainfall. Each of these mixtures is especially valuable for ploughing under for soil improvement purposes.

When sowing, the larger seeds such as Peas, Oats, etc., should be sown first and mixed with manure. The smaller seeds such as Italian Ryegrass, "Mesgawi" Berseem Clover, and Crimson Clover, which require a shallow sowing, can then be broadcasted on the surface, a light harrowing followed by a rolling then completing the operation.

RAPE

(Brassica napus.)

Rape is a native of temperate Europe, and is valuable as a fodder plant, for green manuring and for oil. Like the other Brassicas, it is best adapted to a cool growing season, and for a heavy yield, rich, moist soil is required. Rape may be regarded as practically an **"all the year round" fodder**. It is very hardy, and withstands the Winter well, and although the best results are obtained from Autumn and early Winter sowings, still, seedlings may be also made from the beginning of August to as late as the end of October and good yields secured. Rape, therefore, may also be classed as a Summer fodder.

UTILITY:—Rape is simple of culture, makes a strong, rapid growth, adapts itself readily to various soils and climatic conditions, responds readily to fertiliser and good cultivation, and, most important of all its useful qualities, it is a palatable, wholesome and nutritious green food for fattening sheep or pigs, for grazing horses or for bringing cattle to prime condition for marketing. **It is principally used for green forage**, hardly ever being cured for hay.

In feeding value Rape is about equal to Lucerne, and being quickly grown, it is always likely to maintain its place for Summer forage where climatic conditions are suitable, even where the "King of Fodders" can be successfully grown. The carrying capacity of Rape will be appreciated when it is realized that from **10 to 30 sheep can be fattened per acre**, according to the size of the crop. Rape is also valuable as a soiling crop.



A Field of Brunning's Broadleaved Dwarf Essex Rape.

SOILS AND PREPARATION OF LAND:—Rape does best on very loamy ground of good quality, and on sandy soil well manured; low-lying heavy clay or badly-drained soil is most unsuitable, and where deficient in this element, the ground is much improved by a heavy dressing of lime. An Autumn and Winter fallow for Spring sowing, or a Summer fallow for Autumn seedings very much improves the land, and as the seed is small and requires a fine seed bed, soil preparation must in all cases be thorough. **Proper drainage is also most necessary to success.**

SOWING THE SEED:—Rape must be sown shallow to obtain good germination, half an inch being deep enough, and even in very loose soils the limit depth is 1 inch. Bear in mind that the heavier and stiffer the soil, the shallower the seeding. Rape is generally sown broadcast, in which case **4 lbs. seed per acre** is sufficient.

The best method of broadcasting Rape is with a Cahoon Hand Sower, which sows the necessary quantity accurately. Scatter the seed on the surface with the Cahoon Sower, then brush harrow and finish off with a plain heavy roller to compact the soil around the seed. **Too dense seeding causes crowding** of the plants and smaller growth, and the quantity recommended should not on any account be exceeded.

Rape is also sown in rows with a grain drill and cultivated, the width between the rows generally varying from 24 to 36 inches apart; when seeded in drills, from $1\frac{1}{2}$ to $2\frac{1}{2}$ lbs. of seed per acre is required according to the distance apart. When planted in close rows, say 7 inches apart with a grain drill from 3 to $3\frac{1}{2}$ lbs. seed will be needed to sow an acre, but there is no advantage over broadcasting in this method.

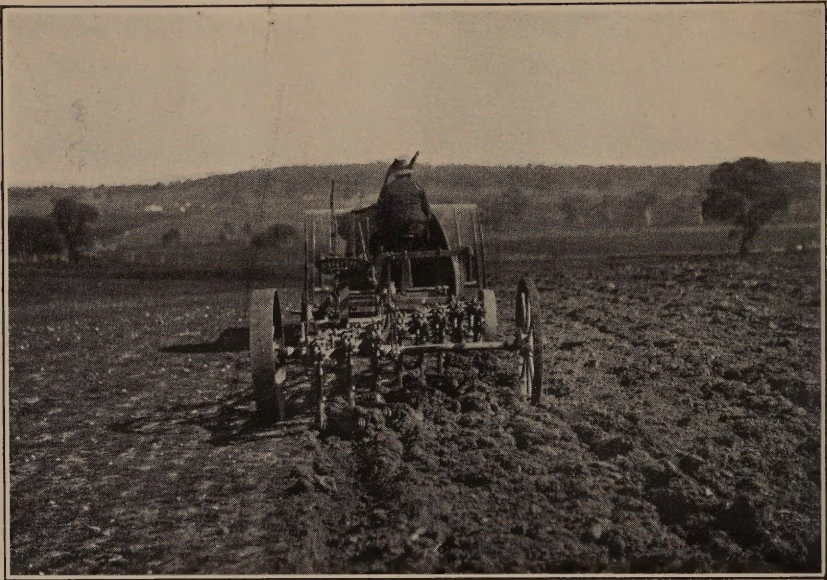
When Rape is grown in wide drills, cultivation should be thorough, a light horse-scarifier being worked between the rows to keep the surface soil loose, and to destroy any weeds that may have sprung up. Two or three scarifyings will be all that is necessary on fairly clean land, as the plants soon develop when the broad leaves will smother the weeds. This cultivation, which is especially essential when growing Rape for Summer Fodder in arid districts, will also help to conserve the soil moisture so important in the successful growing of Summer Fodder crops.

RAPE. (Continued.)

TIME OF SOWING:—Rape is most extensively used as a Winter or early Spring forage, in which case it is **sown** in the Autumn or early Winter, after the first rains in **March up to the middle of June**; but, as a Summer fodder sow from **beginning of August to end of October**, the period of seeding being limited according to the season. For drier districts, the earlier sowing is necessary.

PASTURING:—Allow Rape to get well up, say, about 12 or 18 inches high before feeding off, but put the stock in before the flowering stage, when the crop can be eaten down fairly close, after which there must be a spell to enable fresh growth to take place. A grass and clover paddock to which stock may have access at the same time as they are running on the Rape is of great advantage, as it helps to provide a balanced ration whilst spelling the Rape.

Do not put stock on to well-grown Rape whilst hungry, as they are liable to get blown; the best method is to run them through the Rape when the dew is off and the sun has been on the crop a few hours. If only allowed 10 or 15 minutes the first day, a little longer the second, gradually increasing the time, they will be found to suffer very little, although some cases are liable to occur at all times.



The Australian-made "Sunprince" Plow at work. A most efficient implement.

Rape is usually utilised for pasturing sheep and pigs, although cattle and horses eat it readily, but destroy a considerable portion by trampling, and therefore where intended for this purpose, sow the Rape in rows, which tends to minimise the loss. Cattle feeding on Rape, will consume a larger amount of salt than usual, and this **must be freely supplied**, as it seems to prevent the purging effect, which Rape often produces. **Care must also be taken to prevent bloat.**

FOR GREEN MANURING:—Rape is a valuable crop for improving the land, and ploughed in for green manure, leaves the soil in much better condition for succeeding crops. Though not a legume, it deposits a quantity of nitrogen and phosphoric acid, a fair supply of potash, and a large amount of humus in the shape of decaying root matter. **Autumn-sown Rape is best** for soiling, pasturing through the Winter and ploughing under in the early Spring when about 10 inches high.

RAPE AND MUSTARD:—Sheep and cattle fed solely on Rape, are liable to scour. To counteract this trouble, **sow from $\frac{1}{2}$ lb. to $\frac{3}{4}$ lb. White Mustard per acre** in mixture with the Rape. This mixture is more extensively used than the Rape alone, especially when it is intended to plow the crop under as White Mustard is equally as valuable as Rape for green manuring purposes.

SEED SELECTION:—It is essential that the **right type of Rape seed** be sown. There are several types, but the only strain suitable for fodder purposes is the **true Broadleaved Dwarf Essex** which comes from either England or Holland. Be careful not to purchase French, German, Polish or Japanese Rape seed for sowing down purposes. The safe plan is to **buy only Brunning's Genuine Dwarf Essex Rape**, either Holland or English grown seed. These strains are of about equal value.

Giant Kangaroo Rape is a stronger growing type, yielding (it is said) a much larger bulk of fodder. Excellent results have been obtained from sowing **Brunning's Giant Kangaroo Rape Seed**.

CHOU MOELLIER

(Marrow-stemmed Tree Kale)

Chou Moellier is a member of the Kale family and especially valuable for growing for dairy cows, being **unsurpassed as a milk producer**, and in addition being quite **free from any danger of taint**. The herbage is practically **harmless as regards bloat or scouring** and both high in palatability and nutrition. The plants attain a height of from 5 to 6 feet, carrying a main stalk, which has a sweet and juicy pith or marrow, hence the vernacular name. This main stalk is solid and from 5 to 6 inches in diameter. There are two species, the **White or Green Stemmed** and the **Purple**, both of equal merit and only differing in the color of the stem.

GENERAL REQUIREMENTS:—The climatic requirements, soil conditions and method of preparing the ground is the same as for Dwarf Essex Rape. (See page 57). Chou Moellier is sown thinly in rows 24 inches apart and from 1½ to 2 lbs. of seed is ample to adequately cover an acre. A good method is to take every second hose from the seed drill and to sow 112 lbs. Superphosphate with the seed. Seed may be sown from the first Autumn rains in **March or April right through to October**, but generally the **best results** will be obtained from sowing in April, May or early June.



Chou Moellier or Marrow-stemmed Tree Kale.

Clients who find it necessary to telegraph us, will please note that we have now registered "MYOSOTIS," MELBOURNE, as a Telegraphic Address, and that no further address is necessary in a telegram. For brevity and to facilitate prompt sorting by the Postal Department, please ADDRESS all LETTERS to BOX 857K, MELBOURNE.

SUBSEQUENT TREATMENT:—Where the seed has been sown too thickly it will be necessary to thin out the plants to allow of their proper development. This can be done when the seedlings are about 3 inches high, **spacing out to from 14 to 15 inches** between each plant in the row. No further treatment is necessary except a possible cultivation or two to keep down the weeds, but the plants grow quickly and soon cover the intervening spaces, thus smothering any weeds that may appear later. As the plants grow, **cut the leaves** once a fortnight, **being careful to cut** and not to pull. **Pulling destroys** the new shoots, and thereby shortens the period of usefulness of the crop. By the time the leaf supply has been exhausted, the stems will be thoroughly developed and can be chaffed together with the remaining top leaves. Chou Moellier when established is fairly resistant to dry weather, economical in management, immune to disease, does not cause taint or bloat and can be eaten down to the last shred of the highly sugared stalks. When the green crop is finished with, the strong root system can be plowed under and will improve the texture of the soil by supplying needed humus.

THOUSAND HEADED KALE

(Russell's Improved Strain)

Thousand Headed Kale is closely related to both Rape and Chou Moellier and is an excellent grazing crop for fattening sheep, cattle, pigs and horses, while as a milk producer it is especially valuable. Like Chou Moellier, it is suited only to temperate climates and is not suitable for growing in hot, dry localities even where irrigation is available. It is an excellent crop for sowing to follow on after Rape for Winter feed and is slower in developing than the latter. It **does not cause bloat or scour** and is quite safe to pasture at all times.

SOIL PREPARATION AND SEED SOWING:—Follow the directions for Dwarf Essex Rape in preparing the ground but **sow the seed in drills from 30 to 36 inches apart**. In this way, **2 lbs. of seed** will be found ample for an acre. If the seedlings come up too thickly in the rows, **thin out** when about 3 inches high to **from 27 to 30 inches apart** in the rows. Seed may be sown in **January and February** and again in **May, June and July**.

SUBSEQUENT TREATMENT:—As soon as the plants are a few inches high, **scarify between the rows** to check the weeds and subsequently cultivate until the plants begin to touch each other in the rows, after which no further attention is necessary. The crop may be cut or grazed and being a heavy yielder, can be cut several times as the plants will sprout again immediately and give another good yield in a very short period. When grazing, it is unnecessary to even water sheep or lambs when put on the Kale during the fattening process of six or eight weeks. For topping off this crop cannot be excelled and there is no danger of either bloat or scouring. It is necessary to sow the right strain, the **Russell's Improved Stock** for the maximum results.

AMOUNT OF FARM SEED USUALLY SOWN PER ACRE.

The quantities shown are those generally used, and are only given as a guidance. These quantities vary considerably in some cases according to the conditions and methods of sowing, as well as when used in mixtures. See also the Specimen Seed Mixtures on pages 43, 44 and 56.

Name of Seed.	Quantity per acre when sown alone.	Name of Seed.	Quantity per acre when sown alone.
Alsike Clover	B 12 lbs.	Lucerne	B 15 to 20 lbs.
Ambercane	B 12 lbs.	Lucerne	D 7 to 10 lbs.
Ambercane	D 8 to 10 lbs.	Maize	B 112 lbs.
Barley (all varieties)	B 100 lbs.	Maize (for green fodder)	D 28 to 42 lbs.
Beans, Tick or Horse	B 120 lbs.	Maize (for grain)	D 12 to 14 lbs.
Beet, Sugar	D 8 lbs.	Mangel	D 4 lbs.
Beet, Silver	D 4 to 5 lbs.	Meadow Foxtail	B 12 to 15 lbs.
Bermuda Grass	B 10 lbs.	Mustard (with Rape)	1 lb.
Berseem, Clover	B 15 to 20 lbs.	Oats	80 lbs.
Berseem, Clover	D 10 lbs.	Paspalum	B 6 to 8 lbs.
Birdsfoot, Trefoil	B 3 to 4 lbs.	Peanuts	D 28 to 30 lbs.
Bokhara Clover	B 10 lbs.	Peas, Field	120 lbs.
Bokhara Clover	D 4 to 5 lbs.	Phalaris Bulbosa	D 2 to 3 lbs.
Boyd's Clover	B 4 to 5 lbs.	Planter's Friend	See Imphee
Broom, Corn	B 12 lbs.	Prairie Grass	B 40 lbs.
Broom, Corn	D 8 to 10 lbs.	Pumpkin (Hills)	2 lbs.
Buckwheat	B 50 lbs.	Rape	B 4 lbs.
Burr Clover	B 10 to 12 lbs.	Rhodes Grass	B 8 to 10 lbs.
Carrot, Field	D 4 lbs.	Rye Corn	B 120 lbs.
Chewing's Fescue	B 20 lbs.	Rye Grass (Perennial)	B 40 lbs.
Chou Moellier	D 2 lbs.	Sheep's Burnet	B 30 lbs.
Cocksfoot	B 40 lbs.	Sorghums	B 12 lbs.
Couch Grass	B 10 lbs.	Sorghums	D 8 to 10 lbs.
Cow Grass	B 20 lbs.	Strawberry Clover	
Cowgrass, Giant Colonial.	See Page 17.	(shelled)	B 2 lbs.
Creeping Bent	B 20 lbs.	Subterranean Clover	B 2 to 3 lbs.
Crimson Clover	B 12 to 15 lbs.	Sudan Grass	B 15 to 20 lbs.
Crested Dogstail	B 20 lbs.	Sudan Grass	D 8 to 10 lbs.
Imphee	B 12 lbs.	Sugar Mangel	D 6 lbs.
Imphee	D 8 to 10 lbs.	Sunflower	D 8 to 10 lbs.
Italian Rye Grass	B 40 lbs.	Swede	D 2 to 3 lbs.
Japanese Millet	B 15 lbs.	Sweet Clover	B 10 lbs.
Japanese Millet	D 8 to 10 lbs.	Sweet Clover	D 4 to 5 lbs.
Johnson Grass	B 12 lbs.	Tares	B 120 lbs.
Johnson Grass	D 8 to 10 lbs.	Timothy	B 30 lbs.
Kale	D 2 to 3 lbs.	Trefoil (Black Medic)	B 20 lbs.
Kentucky Blue Grass	B 30 lbs.	Turnip, Field	D 2 to 3 lbs.
King Island Melilot	B 15 to 20 lbs.	Wallaby Grass	B 15 to 20 lbs.
King Island Melilot	D 10 lbs.	Westernwath Rye Grass	B 40 lbs.
Linseed	84 lbs.	Wimmera Ryegrass	B 15 to 20 lbs.
Lolium Subulatum	B 15 to 20 lbs.	White Dutch Clover	B 12 to 14 lbs.
Lotus Major	B 3 to 4 lbs.	Yorkshire Fog Grass	B 20 lbs.

"B" represents sowing Broadcast. "D" is the quantity when sowing in Drills.

(The quantities in all cases are shown in pounds to avoid confusion with the varying weights per bushel of the different seeds and grains.)

ROOT CROPS

The term "Root Crops" covers a class of biennial plants in which the food supply is stored up the first season in the thickened stem and primary root to provide nourishment of the fruiting stem the second season and include a very wide range of important crops. Potatoes, Onions, Chicory, etc., may all be reasonably included under this heading, but the purpose of this article is to deal with those Root Crops which are most generally used for feeding Pigs, Cows, Horses and Sheep. They are in the order of their relative feeding value, the **Giant Half Sugar Mangel** (referred to as Sugar Mangel for brevity), the **Mangel**, the **Swede**, the **Field Turnip** and the **Field Carrot**.

CLIMATE AND SOIL:—Mangels and Sugar Mangel require a **cool climate** and a **reasonably moist soil**, hence their suitability to districts with a good Summer rainfall. They are very adaptable in their soil requirements, and will do well in from fairly sandy loam to medium heavy ground, providing sufficient fertiliser and ample moisture is provided. The heaviest crops are obtained on rich alluvial soils and deep clay loams of a friable nature. Light loamy soils are good, but sandy ground is, as a rule, unsuitable. The root system of both Mangel and Sugar Mangel is extensive, so that the soil should be deep, or where shallow, over a fairly open subsoil. Very stiff compact land prevents the free development of the root, owing to the resistance



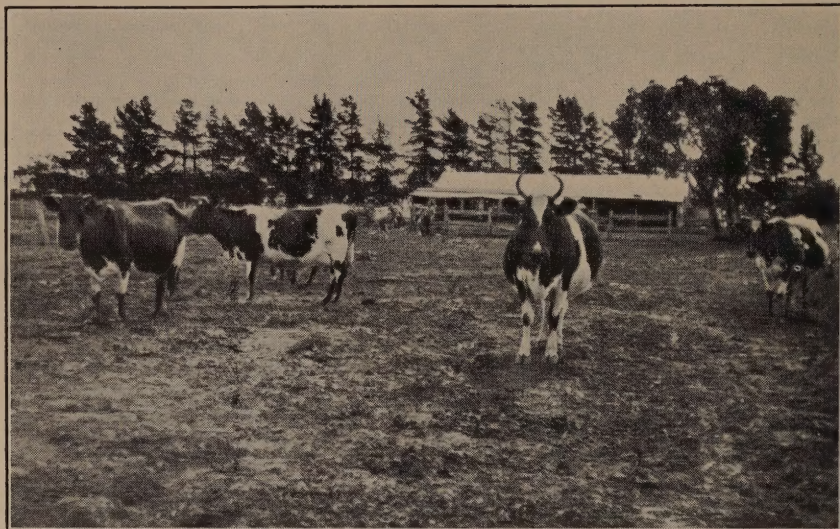
Turnip, Purple Top Yellow Aberdeen.

offered to its expansion. Swedes and Turnips prefer a damp and rather dull climate, and do not withstand dry weather as well as the Mangels. Swedes require an average annual rainfall of about 22 inches, and will thrive on medium to sandy loam, or even on comparatively heavy soil, while Field Turnips can be successfully grown on drier ground from the poorest sand and gravel to the richest loam. The Field Carrot will give results even in poor, soft sand, scarcely able to produce any other crop, but thrives best on loose, sandy friable loam. Mangels and Swedes will give good results under such climatic conditions as the North-West Coast of Tasmania, Gippsland, and Western Districts of Victoria. Field Turnips are a little wider in their adaptability to the district, while Field Carrots may be successfully grown in most parts of the Commonwealth, excepting perhaps the very hottest districts.

SOIL PREPARATION:—Very thorough preparation is necessary to bring the ground into that deep friable condition essential to the free expansion of the roots, and to enable the feeding rootlets to penetrate easily and come into close contact with every part of the soil. When the ground is left in a rough cloddy condition, **root growth is checked**, and the crop prevented from drawing on the constituents it requires. Large quantities of plant food are necessary, and the soil must be worked deeply to extend the area which can be exploited by the roots in their search for this food. Moisture is also required in large quantities to induce successful germination and ensure subsequent development. Start to prepare the land as early as possible, and if the ground is moist when the first plowing is given, harrow immediately, while if it is dry, work the surface as soon as sufficient rain falls to moisten the clods. This brings the soil into fine, firm condition, favorable to the absorption and retention of moisture and breaks up the large open spaces which, by admitting too much air, tend to hasten evaporation and thus dry out the ground. **Plough again** very lightly, **just before seeding**, finally bringing the soil by means of the harrows and cultivator to a very fine tilth to ensure the successful germination of such fine seeds as Swede, Turnip and Carrot, thus the ideal condition before sowing may briefly be described as a fine mellow seed bed. It is **essential** that the **subsoil is well-drained**.

ROOT CROPS. (Continued.)

MANURING:—Mangel and Sugar Mangel are exhaustive crops, and **must not be grown on the same land** two years in succession. As these crops take a large amount of potash from the soil, and also require phosphoric acid, a composite fertiliser will generally be found to give the best yields. One such as No. 2 Complete Manure, containing these two elements together with nitrogen, and supplemented with farmyard manure, is the most suitable. The quantity per acre depends on the amount of farmyard manure used and the richness of the land, but for fair quality ground **112 lbs. of fertiliser** per acre will generally prove sufficient. Swedes, Turnips and Carrots are much quicker maturing crops, and as they require phosphoric acid for their vigorous, healthy development, use **84 lbs. to 112 lbs.** of Superphosphate per acre.



SOWING THE SEED:—Mangel and Sugar Mangel may be sown from the end of **September** to the **end of November**. The best months for sowing Swedes are **December** and **January**, although seed may be sown from October and even as late as March in some districts.

"Service, Satisfaction and Quality" is the keynote of Brunning's policy, and it is on this basis that our business has been built up to its present limits. No charge is made for information and we will be glad to hear from you any time you think we can be of help. Address your letters to Brunning's "Service" Dept., Box 857K, Melbourne.

Seed of Field Turnip may be sown from **October to December**, while the best months for the Field Carrot are **September and October**, although late seedings may be made up to the middle of February.

It is **extremely important** that only selected and tested strains of root seeds are sown. The most suitable Mangels are **Brunning's Mammoth Long Red** for deep ground, and **Brunning's Champion Yellow Globe** for shallow soil. There are two varieties of the Giant Half Sugar Mangel, which are of equal excellence, and only vary in color of the top. One is known as Rose and the other as White. The most suitable Swedes for Australian conditions are **Champion Purple Top, Skirvings Purple Top, Elephant Purple Top, Defiance Purple Top** and **Ne Plus Ultra**. In Field Turnips, **Purple Top Yellow Aberdeen, Green Top Yellow Aberdeen, Purple Top Mammoth, White Stone and White Globe** are all good reliable sorts. The Field Carrots most successfully grown in this country are **White Belgian, Sinclair's Champion** and **Yellow Belgian**. Sometimes the table sorts, **Chatenay** and **Red St. Valery**, are also grown for Stock feed.

MANGEL—Drills 36 to 48 inches apart.	4 lbs. per acre.
SUGAR MANGEL—Drills 21 to 24 inches apart.	6 lbs. per acre
SWEDE—Drills 30 to 36 inches apart.	2 to 3 lbs. per acre.
FIELD TURNIP—Drills 30 to 36 inches apart.	2 to 3 lbs. per acre.
FIELD CARROT—Drills 30 inches apart.	4 lbs. per acre.

The germination of Mangel and Sugar Mangel seed may be hastened by soaking. After sowing it is necessary to draw a light roller over the ground so as to compact and firm the soil round the seed. Unless this is attended to germination may be patchy.

ROOT CROPS. (Continued.)

SUBSEQUENT TREATMENT:—When the seedlings are well above the ground, and can easily be seen in the rows, give the land between the rows a light scarifying to loosen the soil, and **to destroy any weeds** that may have sprung up. Any strong growing weeds that appear in the rows before the plants are ready for thinning out, must be carefully pulled by hand. When the plants are from 3 to 4 inches high, it is **time to thin out**, and this is usually done with a hand hoe. The plants are later on singled out by hand, leaving plenty of room between each for the development of good sized roots. For this purpose the following distances are required:—

MANGEL, 15 to 18 inches.

SUGAR MANGEL, 12 inches.

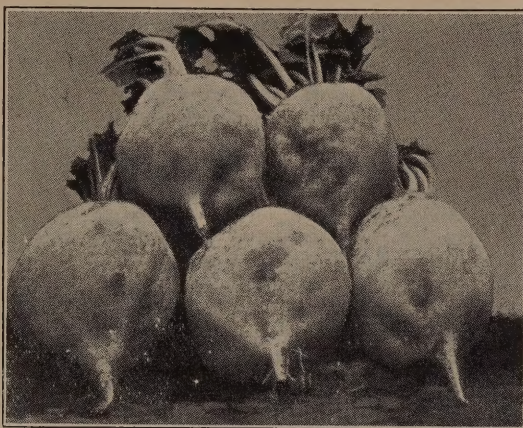
SWEDE, 18 inches.

TURNIP, 18 inches.

CARROT, 9 to 12 inches.

DISTANCE AND QUANTITY:—Sow Root Crop seeds in drills, the distance apart and the quantities per acre being shown as hereunder.

After thinning out, the only attention necessary until the roots are ready for lifting, is to occasionally scarify the land between the rows, and to hoe the ground between the plants. If the land is worked three times before thinning out, it will generally prove sufficient, as cultivation can only be practised while the plants are comparatively small; when the plants have grown sufficiently to meet each other in the rows, they will smother the weeds.



Mangel, Champion Yellow Globe.

HARVESTING:—Mangels and Sugar Mangels **should be carefully pulled**, the adhering soil shaken off and the top cut or twisted off just above the crown. The easiest method is to take out a deep furrow on each side of the row with a plough, and there will then be no difficulty in lifting the roots. The crop takes 6 to 7 months to reach maturity, which is indicated by the stoppage of growth and the leaves becoming yellowish and wilted. Delay harvesting until maturity is reached, so as to get the highest yield and best quality. Immature Mangels and Beets may be fed in small quantities to pigs, but not to cows as they impart a bad taint to milk, and are likely to cause scouring. No bad effect will follow the feeding of matured roots. Swedes and Turnips may either be kept in the ground and eaten by sheep in the Winter when green stuff is scarce, or lifted, as with Mangels, and stored. Before feeding to cattle, cut Swedes and Turnips into pieces, as the animals are apt to swallow the whole or irregular portions of the root, and are thus liable to be choked.

STORING:—When any of these Root Crops are intended to be stored, the leaves, together with all earthy matter, must be removed and the roots thoroughly cleansed, although this is really necessary in any case. **To store successfully**, it is necessary to provide protection against frost, prevention against sweating, an even temperature and good ventilation to carry off the gases that are likely to accumulate, and to guard against the damp which is likely to cause decay, or too dry a place which may cause the roots to shrivel. **The best method of storing** Mangel and Sugar Mangel is to place on a bed of straw in a well-ventilated shed in stacks about two feet deep, but where sheds are not available the roots can be kept fairly well by stacking on dry straw on a well drained piece of land in the open.

Swedes and Turnips may be stored in good condition for about 8 to 10 weeks, but if kept for any greater length of time the proportion of woody matter increases, rendering the root unpalatable and less easily digested.

The preceding methods will, under ordinary average conditions, ensure a payable and successful yield of whichever root crop or crops may be selected. Mangels and Sugar Mangels are most suitable for feeding pigs, cows or stud sheep, because of their succulent and palatable nature. The Sugar Mangel has the highest feeding value of all the root crops, the Sugar Beet coming next. Swedes and Turnips have good feeding value owing to their succulency, bulk, palatability, digestibility of the dry matter, and the high percentage of sugar contained, and are valuable for feeding sheep, pigs and cattle coming in at a time when other food is scarce.

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External view of Brunning's Bulk Store, 22 Hanna Street, South Melbourne. The left-hand side (No. 1 Store) is devoted to Storeman's Office and Storage Purposes, while the Upstairs portion is utilised as a Sorting Room for hand-picking Beans and Peas for export.

Half of the right-hand side building (No. 2 Store) is devoted to Cleaning Machinery, the balance being used for Storage Purposes.

The right-of-way in between the two buildings was specially retained in order to facilitate speedy loading and unloading.

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